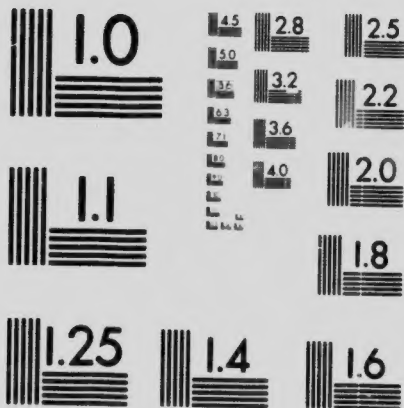




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**HOME VEGETABLES
AND SMALL FRUITS**

THEIR CULTURE AND PRESERVATION



A thrifty gardener's dooryard

HOME VEGETABLES AND SMALL FRUITS

FOR THE HOME GARDENER

OF THE STATE

OF THE STATE OF NEW YORK
OFFICE OF THE STATE ENGINEER
ALBANY, N. Y.
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HOME VEGETABLES AND SMALL FRUITS

THEIR CULTURE AND PRESERVATION

BY

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PREFACE

GARDENING in America has turned over a new leaf—a leaf as definitely new as that the so-called society butterfly turns who sets about earning her own living. The garden also has begun to earn its own living. It is following the well-worn dictum of William Morris: It may be Beautiful, but it must also be Useful.

Thrift, that homespun virtue, formerly the sole ornament of the dwellings of the worthy poor, has unexpectedly become popular, like a bit of old china which had adorned a shelf in a humble cottage or even served a simple use and, suddenly grown fashionable, finds itself seized upon, polished, and treated with unexampled respect as a prize for a fashionable collector. Thrift is no longer a humble flower to bloom unseen; it has become the chief flower of the garland. Young women, who, a few years ago, would have scorned to know anything more of a garden than the silver-bells and cockleshells of Mistress Mary, now take a passionate and heartfelt interest in the welfare of humble potatoes and cabbages.

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Of course, much of this interest is ephemeral and will pass when the exigency has passed and when thrift is out of fashion, but much is not, and the wave of thrift, however temporary, is destined to leave its mark on our gardening.

Except for the gardens of the French nobility before the Revolution, I doubt if the gardens in any country were as thriftless as ours before 1917. This was true not so much of the gardens belonging to the great estates—in fact, these and most large garden places were fairly sure to have also excellent kitchen-gardens—but the suburban gardens, whether the owner possessed small or large means, these in a tremendous proportion were planted without any idea whatever of their making themselves useful. In fact, the garden much resembled the Early Victorian heroine—decorative, but never by any possibility useful. Grounds, however small, were sacred to the class known as “ornamentals.” An existing apple or cherry tree, the survival of an earlier day, might, it is true, be respected or even prized, but the modern owner planted no such humble garden folk; rather his choice was for the Colorado spruce, the Japanese maple, or the ubiquitous *Catalpa Bungei*.

The foreign-born, it is true, did otherwise. Even in crowded parts of the city the tiniest ground space, pathetically small, would yet give an Italian room for his scarlet peppers or perhaps a fig-tree; while in

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the suburbs his little highly intensive gardens became shortly truck-gardens, but the native-born made no such use of their land.

For my own part, I cannot help thinking that the wide-spread fashion of fencelessness and consequent defenselessness against the onslaughts of any chance dog or cat has had more to do than any one influence in keeping our suburban gardening so strictly to shrubs and lawn space. Who cares to plant early peas, to tend them carefully, only to have one's labors laid waste in a single morning by the neighbor's dog?

“. . . To nurse, to rear,
And then to lose!”

said Jean Ingelow. Nay, rather than make for ourselves such disappointment we will go gardenless! Such was the attitude of the average suburbanite. And who can blame him?

Yet the earlier gardening in this country was thrifty enough. The colonial gardens were primarily and essentially gardens for use; flowers were introduced to embellish, to give grace to, but not as the prime reason for the garden fruit-trees, currant-bushes, grape-vines, strawberry-beds, herb-beds—these were given full importance; these were its *raison d'être*. Even the roses, which in the South grew extravagantly, lent themselves thriftily, after

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blooming, to a delicious conserve, and so justified their planting. Beauty might be its own excuse for being, but it wasn't sufficient excuse for planting in the garden unless it had another talent. So we find daffodils used merely to border the paths and lilac-bushes set at the house corner where was not space for anything else. And somehow the fact that the flowers were so used, merely as accessories, made them the more endearing.

But these gardens were fenced. No one thought of attempting a defenseless garden. This practice was merely the habit and custom of the Old World brought over here, but it was a habit founded on experience. It was not only to exclude Romeos that the orchard walls were high and hard to climb, but to insure the safety of the fruit.

The new gardener will undoubtedly revert to this old-time practice of protecting his enterprise. Of course, among those who engaged in the wild and rather feverish planting which was epidemic in 1917 there may be many who will not care to repeat the experiment; gardening was a passing fashion and the enthusiasm will have gone by. Especially will the defection be among those who did not go a-gardening themselves, but turned over their land to others or simply caused a garden to be made. But the householders and more particularly the housewives, who set a-planting in their own yards

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will be keen to try again. If the garden did not fare well, then so much the stronger will be the desire to make it better. Failure is educative; many a one who has lost a crop knows exactly, after it is over, what caused the failure and no such mischance can catch him again.

Besides, the housewife has had a taste of the fine independence of the farmer. What cares she for the exorbitant prices of the green-grocer when she is able to grow in her own back yard the food she needs, and better and fresher moreover?

Also it is true that "once a gardener always a gardener." The housewife who, during last summer was set a-gardening by a sudden panic lest, in the possible food shortage, she might not be able to provide for her household, will not give it up. Even if she began her gardening because it was the fashion, she may find a real liking and love for it and the joy of a new accomplishment. If she grew vegetables successfully one summer certainly she will the next. One may expect the old rivalry for the earliest peas and corn and the finest strawberries; and commuting husbands may grow fairer and fatter for being fed on fresh-picked instead of faded vegetables, and our suburbs will begin to blossom with hundreds of tiny gardens—gardens as thriftily managed as those of the French peasantry.

Another definite characteristic of the new gar-

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dening is co-operation. The garden club has changed its view-point. No longer do the well-to-do possessors of pretty gardens come together for garden chat, the clubs have become active clearing-houses of garden information—clearing-houses that are of very real assistance to every member, while the membership also has in most cases been increased to the comprehensive and catholic state of including all who are trying to make gardens. More than ever before in America has gardening become democratic. And the new note in our gardening, a note one hopes has come to stay, is that of sincerity. We shall plant the kind of gardens we need—not what some one else plants, or what some one thinks we ought to plant, but what we want—a garden that fits the needs and the taste of the household it must serve. Nor shall we forget readily the homely use of the garden—to provide food; and after the needs of the family, then the garden will serve the needs of the community.

Perhaps, as a people, we may return to the ancient Israelites' idea of peace and prosperity, when "every man" should "sit under his own vine and under his own fig-tree and none shall make him afraid"—not even the High Cost of Living.

FRANCES DUNCAN.

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**HOME VEGETABLES AND SMALL FRUITS
THEIR CULTURE AND PRESERVATION**

Home Vegetables and Small Fruits

I

THE THRIFTY GARDENER

Much is expected of the home vegetable-garden. It must be as compact, its small space as well arranged, as a ship's cabin. It must make good from an economic standpoint—in short, it must earn its room and board. It must be goodly to look upon or neither the business nor professional man will bother with it; it must be interesting, or he will tire of it. In fact, as many and as varied excellences are required of the small garden as of the ideal wife—she who, according to the frequent counsels in the women's sections of the press, possesses equally charm and cooking ability; who delights her husband's eyes by her taste in clothes and conserves his pocketbook; who has the fascination of a chorus-girl, the dependability of an oak; who rests her husband when he is tired, stimulates him when he ought to work, and whose interest for him is inexhaustible.

Despite the largeness of the demand, a degree of success is as possible in the garden undertaking

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as in choosing the human helpmeet, if one considers what he wants, not what he ought to have, and sets out to obtain it. Therefore, before following implicitly any one of many possible plans, the householder is counselled earnestly to think what he would most like to have in his garden—what would add most materially to his comfort and happiness—and to plant that.

First, it should be remembered that the small home garden occupies a different position from the garden which is a commercial venture. Different demands are made on it. It must meet the needs of the individual family rather than the open market. It is a present help to the family larder, a valued auxiliary to the kitchen, and the cook's best friend. Frequent plantings rather than banner crops should be its policy—frequent plantings which maintain a steady and varied supply rather than a fine abundance of one particular vegetable which persists until even a docile family will eat of it no more.

Specializing is very well if one wishes to make a reputation or to take prizes, but the home garden is of more value if it serves as an inspiration to the housewife, a place as full of suggestion as a ten-cent store. Madam Housewife will take a walk in her garden in the morning instead of racking her brain for what to serve and then going to the telephone.

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A little of everything should be in the home garden. There should be the herb-bed with mint and thyme and summer savory, marjoram and tarragon; green peppers and endive, lettuce of various kinds; for from February to December the garden should be able to yield a salad; there should always be "something for soup."

It should also be a tempting place to visit. We Americans have a silly habit of divorcing the useful and the beautiful, of treating the house and its immediate grounds as in a way sacred to Ornaments, and by Ornaments meaning trees or shrubs grown solely for their looks, while in the garden "handsome is as handsome does" is the standard. It would be hard to find a more endearing beauty than that of young cherry-trees or apple-trees in blossom; and that these same lovely things are gifted in the matter of furnishing material for preserves and pies should not disqualify them for "home-ground" planting. Quince-bushes and currant-bushes are decorative as well as useful. Blackberry-vines will screen a chicken yard as effectively as clematis. A grape-vine will be as decorative a porch vine as one could wish, and although it will not produce such large fruit as when pruned and grown in orthodox fashion, yet it will yield a fair crop and cheerfully serve the two purposes.

The small home garden is, as I have said, in a

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different position from the garden which is frankly commercial. Questions come up for consideration in its planning that do not concern the farmer, and, on the other hand, the farmer has to weigh well matters and balance expenses that never trouble the small gardener.

For the latter there are such questions as: Who is to tend the garden? How much labor is to be bestowed upon it? Is it to have a few minutes every day, or weeks of diligent attention, and then suffer a couple of months' hiatus in the gardener's activities?

Then, the kind of labor is to be considered. It frequently happens that the amateur gardener can put into his gardening brains rather than brawn. There are many crops which require intelligence in their planting and tending rather than long hours of arduous cultivation. Take the asparagus-bed, for instance, which is usually treated as rather difficult gardening—and indeed it would be for a child; its planting and care are unlike that of the ordinary run of vegetables. And yet the precise method of making and caring for an asparagus-bed is easily understood by any grown-up of intelligence; the way of planting presents no difficulties to his apprehension, while as far as skill with the hands is concerned, no great amount is required. The young asparagus roots are lusty things, incomparably

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less fragile than the seedlings of annuals raised in boxes indoors—a practice which every one is cheerfully advised to try. Once planted, the asparagus-bed takes care almost of itself and can be left untended with impunity all summer long.

So with the care of dwarf fruit-trees, or grapevines, or strawberry-beds—in all of these intelligence rather than brawn is required, ability to comprehend a process rather than long hours of labor. And it is this ability to comprehend that is the amateur gardener's "long suit."

The use of glass in the small garden may seem ambitious and unwisely professional, but it is really a very great saving of labor and anxiety. While for the farmer glass may involve him in a deal of labor and expense, for the amateur with the small garden the most rudimentary glass equipment simplifies and expedites his garden work as the vacuum cleaner simplifies the process of sweeping. His scale of operations is so small that he can do easily what would to the farmer be a large undertaking. If he has but a half-dozen hills of melons, to place the small portable frames over them is no very arduous labor, yet it spares him anxiety and neutralizes the ill effects of a lack of judgment that may have planted out the melons disastrously early. When a late frost threatens it is a simple matter to lay the sash close over the cold-frames or to

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clap a portable frame over a too-adventurous seedling—as simple as laying an extra blanket over a human plant when the weather turns suddenly cold.

A very rudimentary hotbed or cold-frame, even a home-made affair with discarded window-sash for glass, will assure the success of the gardening besides increasing the length of the gardening-season by several months, while the skill and experience required is as nothing to that needed for the starting of seeds indoors under ordinary house conditions.

As the amateur gains a familiarity with the garden processes he will be tirelessly experimenting—not recklessly abandoning the old and tried varieties for the new, but he will have his tiny experiment plot where new and widely heralded varieties are “tried out.”

Although the garden be utilitarian of the strictest sort, the gardener will find that year after year it will grow more full of charm. There will be the permanent features—espalier fruit, or dwarf trees, the herb-bed, the tiny greenhouse, the frames which the gardener may shift until he has the best possible place for them. The other plantings will change and rotate with each season. He will tuck flowers wherever there is space for them, because he cannot help it; plant tulips in his strawberry-beds, to which the berries have not the least objection, and

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edge a flower-border with strawberry-plants. He will set sweet peas beside his garden-peas, some hills of Scarlet Runner to give color to his regiment of pole-beans. Season after season, as he tends his garden, one bed after another is enriched and brought into perfect condition, until the little garden is as complete as a well-appointed kitchen. And presently the gardener finds also that, although he may have begun with an Eden-like innocence of garden-craft, he has won a fair local reputation as a gardener, that he has that especial interest in a few plants which is the beginning of expert knowledge and that his small garden has for him not only a fascination for a season, but an abiding interest.

II

THE SOIL

Nothing is more vital to the success of any garden enterprise than the soil. As the man about to build a house first sits down to count the cost, so a gardener looks to his soil. Deep digging increases the feeding area for the roots, tempting them to go in the direction which for them is safest. Shallow digging keeps them near the surface and makes suffering from drought probable.

Aside from the actual amount of nourishment in the soil, its texture is of importance. A hard, stiff soil is difficult for roots to penetrate. A hard layer of subsoil sheds both fertilizer and water instead of storing it against the later needs of the plants.

The amateur gardener has several methods of ascertaining what sort of soil he is blessed with. One is to dig in different parts of his garden, taking up a quart of earth in each place, mark these exhibit *A*, *B*, and *C*, and send them to the nearest agricultural experiment station for analysis and advice as to remedial treatment.

THE SOIL

The simplest method for the beginning gardener is to ask counsel of a successful gardener in his neighborhood. The gardener, like other people, usually does not mind in the least giving advice. He can tell by the look of the soil and by the feel of it what it needs. He can also tell fairly well of its condition by observing the character of the weeds or grass growing on it. Sorrel, for instance, indicates the need of liming.

A stiff, clayey soil can be improved both in richness and in texture by the addition of manure. Coal-ashes will improve its texture, but add nothing to its fertility. The addition of muck to a sandy soil immensely increases its quota of nitrogen.

Here is a rather rudimentary, but an extremely practical method of soil enrichment for a small garden. Transport to the garden-beds by means of wheelbarrow or hand-cart several cubic yards of good top soil taken from wherever one can obtain it for the 6 or 8 inch top layer in hotbeds and cold-frames. This is the simplest method and for the city gardener the surest for the city gardener's soil is likely to be permeated with gas and other ill-smelling ingredients for which his plants have small liking.

Gardening is a progressive affair, and some of the most perfect little gardens have been built up gradually, first one bed, then another, brought into

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top-notch condition. Always when replanting is done the soil is enriched. Soil inoculation and a crop of legumes—peas or beans—are a diverting and a very simple way of increasing the nitrogen in the soil, and the next crop profits greatly.

For vegetable-growing the ideal soil is a light, rich, sandy loam, well-drained. This kind of soil is the joy of the Early Gardener. If heaven has not dowered him with it, then at least he can provide it for his hotbeds and cold-frames, if for no more of his gardening. Such a soil is admirable for the early crops, for radish and lettuce, for muskmelons and watermelons, beets and carrots, and onions. For early peas the soil should be light but need not be rich.

For cabbage and cauliflower the soil should be rich and rather heavy. Potatoes need it rich and well worked and do well in a gravelly or even a rocky loam; they require good drainage.

TREATMENT FOR WORN-OUT AND WEED-INFESTED LAND

It often happens that the amateur gardener has for the field of his enterprise land that is worn out, and besides that is Gibraltar-like in hardness and rich chiefly in its variety of weeds.

In this situation there are several courses that he can pursue. One is, to hold in abeyance his

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passion for vegetable-gardening and devote a season to getting the land into good condition. Then by liming, deep ploughing, the growing and ploughing under of green manure, cow-peas and the like, manuring heavily with stable manure, get the soil mellow and rich. Of course land varies; what is imperatively needed by one prospective garden may not be needed by another. Here follows one prescription which is catholic enough in its treatment to wake up any dull and apathetic garden-soil to its duties and possibilities.

First comes ploughing. This is done as early in the spring as the ground can be worked. If the garden is a half-acre, plough in 500 pounds of burnt lime. Not only should the ploughing be deep, but the soil should at this time be harrowed and pulverized to make it as fine as possible. Then sow Canadian field-peas, about 3 pecks, and a bushel and a half of oats. This crop must be ploughed under in early July or late June, and at the same time the land heavily manured with well-rotted barnyard manure, the coarser the better. Fifteen or twenty loads can be used to advantage. This is well worked in and the next sowing takes place, a bushel of buckwheat and rye and 10 pounds of crimson clover. Leave standing until frost, let the buckwheat die down and in the spring plough again, early, manuring again with 15 or 20 loads of well-rotted manure.

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Plough thoroughly and harrow, and the ground will be rich enough and mellow enough to suit the most exacting vegetables.

Instead of the late June planting of buckwheat and rye and crimson clover, the gardener who wishes to harvest a crop as well as to enrich the land, might plant white beans in hills 4 feet apart each way and give them thorough cultivation. Sow rye among the beans in September. In the spring plough all under, ploughing in another treatment of lime—say 250 pounds. Harrow and plough thoroughly and the ground should be in fine condition for vegetable-growing.

PLOUGHING AS A REMEDY FOR INSECT DEPREDACTIONS

When the garden has been greatly troubled by insect pests, by cutworms or by grubs, ploughing and leaving the land to weather does much to dislodge the enemy. It breaks up the comfortable winter quarters in which they were ensconced, destroys many of the larvæ and leaves others an easy prey for birds. If the garden is too small for convenient ploughing, spading will give essentially the same effect.

METHODS FOR THE TINY GARDEN

In the small garden it is often most convenient to use the installment plan to bring the soil into

THE SOIL

good condition. If it is not possible to prepare the soil of the entire garden at once, then one bed after another can be put into commission. At each re-planting of the garden-beds, the soil is enriched and dug over, and where the soil is poor, the last crop might be of beans to be "dug in" as green manure.

Inoculation of the soil may be tried on a very small scale, followed by a planting of peas or beans, and is very amusing for the amateur, besides being of real benefit to his garden.

TRENCHING

One of the best methods for the small garden is that way of preparing the soil known as "trenching." The suburbanite often suffers seriously from the extraordinary practice of contractors who in grading about the newly built houses carefully bury the good top soil some 3 or 4 feet deep, and put on top for the suburbanite's planting a layer of hard-pan raked attractively—smooth and even. It is enough to make a good gardener weep to observe the way of the contractor when land that was once old garden is cut up into small holdings, and the rich, deep mellow soil put where it can be of no possible use.

The operation of trenching is as follows:

At one side of your garden or garden-bed, dig a

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trench 2 feet deep. Put the soil in a wheelbarrow or cart, take it to the other side of the garden-bed and there deposit it. Dig a second trench next the first. Throw the top soil into the bottom of the first trench, and when the poorer soil is reached, mix in well-rotted manure or other fertilizer to complete the filling of the first trench. The second trench is filled in the same manner as the first; stones and poor soil can be cast aside as dug, and when the trenching is finished, the contents of the first trench fill the last one.

ROTATION OF CROPS

Even on a small garden, the farmer's practice of rotation of crops should be followed. The reason for rotation is that different vegetables make different demands upon the soil; when the same demand is iterated and reiterated the soil becomes exhausted. The usual planting is a root-crop following a "top-crop" and the reverse.

DROUGHT INSURANCE

Deep digging is one of the most valuable of insurances against drought. The roots then strike easily down deep to search for moisture. If a top or surface mulch is maintained, that is, if the soil is kept loose and light by cultivating, a soil blanket is formed which acts as a non-conductor, and pre-

THE SOIL

vents the moisture below from escaping. With deep digging and a surface mulch the garden can endure a severe drought without suffering.

GRADUAL SOIL IMPROVEMENT

If one is content to do without banner crops in his first experiment, he will gradually bring his soil into full fertility. If it is stiff, he will add to it barnyard manure as he can afford that luxury; he will add sand, if sand is convenient. If his soil is wet, he will choose another place for his garden if he cannot afford tile under-drainage. If his soil is shallow, he will deepen it, every year spading or ploughing a little deeper. The garden should have at least one foot of rich, mellow soil.

III

POSITION OF THE GARDEN

The most ideal spot for a vegetable-garden is on good soil, naturally well drained, and facing south or southeast. Shelter on the north and northwest side is a definite advantage, though the large trees must not be too near or the garden will suffer. Tree roots have a longer reach than most amateur gardeners allow for. An elm thinks nothing of stretching out 50 feet for richness of soil and moisture.

A windbreak of closely planted fruit-trees 30 feet to the north of the garden is a valuable asset. It is a practice of many expert gardeners to plant very early varieties of cherry so that the birds may regale themselves on these, and let alone the better sorts which ripen a bit later. A wind-defense made of tall-growing shrubs that are especially attractive to birds is a feature of some little gardens. Such shrubs as the white-fruited dogwood (*Cornus candidissima*), the black alder (*Prinos verticillata*), the white-fruited Russian mulberry, and the viburnums are much relished by the birds, who are thus able to use them as dessert after having made a meal of the insects in the garden.

POSITION OF THE GARDEN

The garden should lie within convenient reach of the house. There is nothing whatever in the planting of a kitchen-garden that makes it an object which needs to be screened from view, and a very slight setting will give it much charm and character and yet decrease not the slightest its usefulness. An arch of roses over the garden-gate, a grass path down the centre, spanned at the cross-paths by rose-arches, or if one chooses by an arch of Scarlet Runner beans, does not interfere with the utilitarian aspect of the garden, and yet gives a deal of satisfaction to the eye.

A vegetable-garden is "formal"; it can't help but be formal, its plants are in rows and set at exact distances, and if given a slight setting, it will have all the charm of an architectural garden. Cabbages and rhubarb are quite as handsome in foliage as Caladium, growing corn is quite as beautiful as the canna—more so in fact, for there is nothing harsh in its green. From the first blossoms of the young cherry-trees to the yellow-brown shocks of standing corn garnished with the deep orange of ripe pumpkins, the vegetable-garden need have no reason to blush unseen.

GARDEN BOUNDARIES

In a small garden some defense is frequently necessary against the depredations of the neigh-

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bors' cats and dogs or hens (one's own hens, of course, are properly cloistered and would never dig up any one's planting; one's neighbors' are different). For this purpose a fence of poultry-wire is the most effective. Peas—sweet peas or the garden peas—may be planted on either side and the wire utilized as a support, or climbing beans will grow on it. If the netting be securely set up and tightly stretched, the boundary will be decorative rather than otherwise. If the gardener considers that a low fence will be protection enough, then between the posts, and joining them at top and bottom, should be "stringers." These painted dark green with the small-meshed poultry-netting stretched tightly and tacked securely make a very creditable low fence. On the house side, flowers may be grown against it; on the garden side, of course, is the worthy vegetable proletariat.

When the planting about the house is informal or naturalistic, and the vegetable-garden is near, it is especially desirable that there be a definite boundary of some sort; the two are unlike in character and will not agree contentedly; but with a definite division, a hedge or a grape-trellis, the case is different and the vegetable-garden or kitchen-garden becomes an interesting neighbor instead of an intruder.

POSITION OF THE GARDEN

IN RELATION TO THE HOUSE

When near the house, the kitchen-garden should be planned in relation to the house, just as if it were a formal garden for which the services of a garden architect had been obtained. This is no more trouble than to ignore the relationship, and makes all the difference in the world in the appearance of the garden.

For instance, if there is to be a gate in the poultry-wire fence, see that the gate is on a line with the house-door or a side path, so that one looks from the house straight down the garden-path. A garden near the house should be on the same axis with the house. Or, if near outbuildings, it should be in relation to them. It is the exercising of a little care in this matter of relating one part of a place to another that makes the difference between a place being charming and being uninteresting. A number of unrelated buildings brought forcibly together are rarely in harmony, while to bring them into harmony is often a far simpler matter than appears.

PLANNING THE GARDEN

Permanent features, of course, are arranged first and given their places. The crops may rotate, but dwarf fruit-trees and gooseberry bushes and cold-

HOME VEGETABLES AND SMALL FRUITS

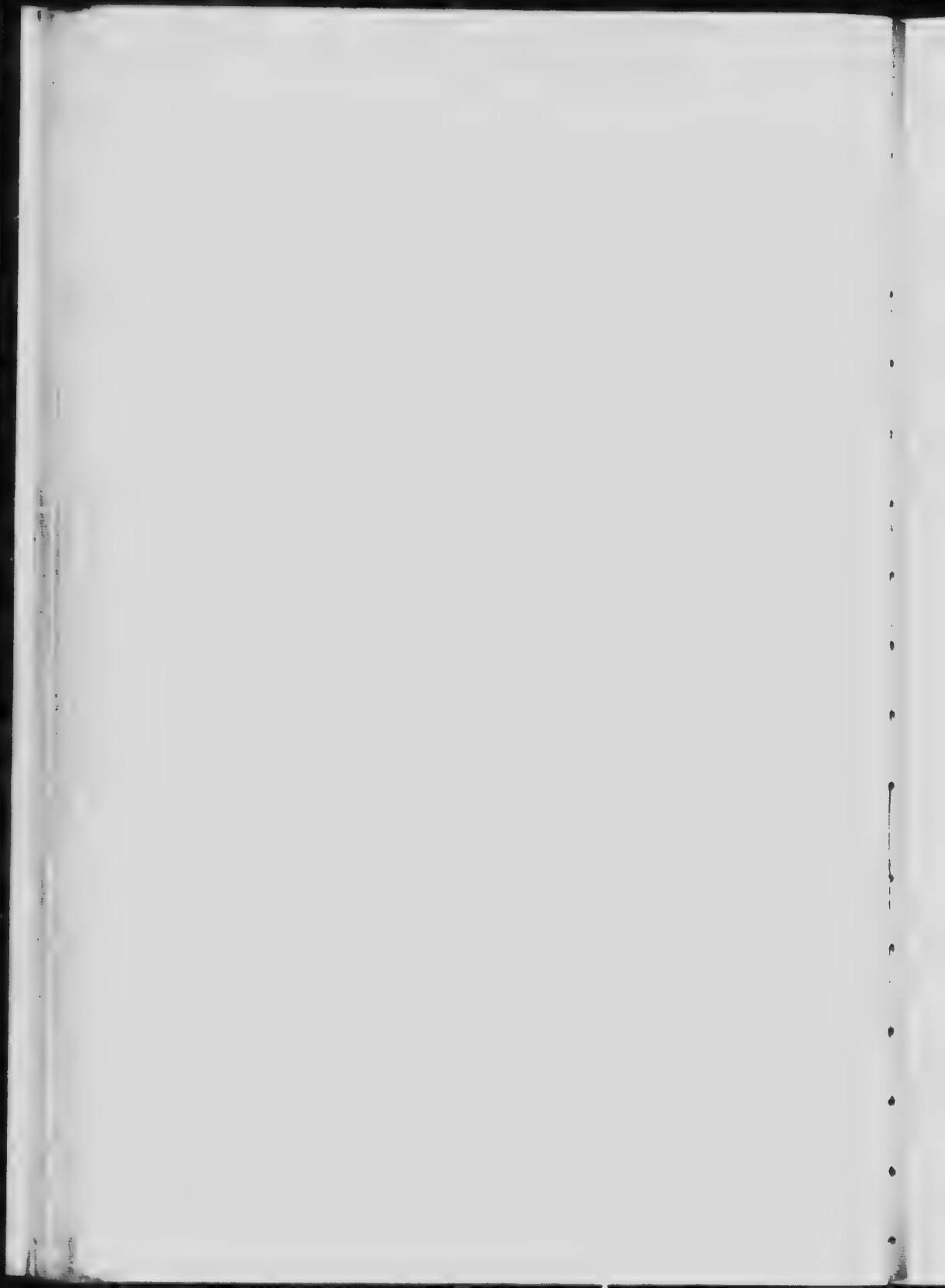
frames and hotbeds do not rotate. When once established, they stay.

An orchard to the north of the garden, or dwarf fruit-trees grown espalier fashion against a trellis, make a charming boundary for the north and west. Grape-trellises may form one side of the garden. The cold-frames and hotbeds should have a sheltered position, not close against a fence, for there should be space all around them, but they should be near enough to have the protection. Once the place for these settled, next comes the other permanent planting, the location of the asparagus-bed, of the bush-fruits, of the strawberry-bed, the rhubarb, and all the planting that is not transient. The herb-bed should be near the house and easily accessible, and the salad should not be far off, for the cook's and the housewife's steps should be considered, and if these excellent women are to be tempted into the garden, the material most frequently wanted should be near at hand. The two or three or four crop beds should be nearer the house than the one-crop beds, simply to save steps.

Cold-frames and hotbeds should be easily accessible; these require considerable supervision and quite constant oversight, rather than heavy work, and should be where one can't help seeing them and how the infant plants are getting on.



A border of flowers gives charm to the kitchen-garden. Asters, zinnias, or marigolds are good for this purpose



IV

PLAN AND ARRANGEMENT

It is far more necessary that the vegetable-garden have a plan than that the flower-garden be so honored—as necessary as it is that a hotel clerk keep an accurate record of who is the occupant of each room, otherwise, how can he know where to place the newcomer? In the small kitchen-garden, always there are newcomers, always there are seeds to put in and seedlings to be transplanted that must have places assigned.

The simplest method of making a plan and, to my mind, the clearest is what I have called the “kindergarten plan.” Take the squared paper such as architects use; the sort that is printed with five squares to the inch is the most convenient. On this plot out your garden. Each square represents a foot and if you know the dimensions of your ground it is easy enough to mark the boundaries. Next put in paths where they exist and whatever other permanent features the place possesses, trees or hotbeds or fruit-bushes. If the gardener borrows his small son’s or daughter’s colored crayon and makes the garden-path brown or gray (if of gravel)

HOME VEGETABLES AND SMALL FRUITS

or green (if grass) and makes green a few squares outside the garden limits (if grass it be that lies beyond), then his planting space stands out very clearly, marked off into squares. Next he marks the planting, writing in the names of the vegetables, or, if he wishes to have the plan more pictorial, he will use a thin line of green or small green dots for lettuce, large red dots for tomatoes, spacing them properly, and allowing 3 feet each way for his tomatoes. In the same way beans and peas should be marked with the proper space allowance. Squash-vines may be indicated by a handsome yellow. Of course this method sounds infantile, but it enables one to see at a glance exactly where his seeds are planted and to visualize his prospective garden before a single seed has sprouted; also it saves time—which is not childish.

The garden-planting is greatly simplified if at the time of plan-making planting directions are written in. For instance, where the thin green line of "lettuce" shows, is added beneath it: "Sow thinly, rows 8 inches apart; thin to stand 6 to 8 inches in the row; sow every two weeks for succession."

If the plan thus made be tacked on the tool-house door or in any convenient place, it will be found an invaluable assistant, and wholly prevent any confusion. After the first crops are harvested, an-

PLAN AND ARRANGEMENT

other plan is made similar to this (and duplicating is very easy), showing the new plantings for the second crops. Perhaps four will be necessary for the season. At the end of the season these are marked and put away for reference. They will be found extremely useful in planning the next year's garden.

Making the garden plans is work that can perfectly well be done in the winter. The most inspiring time for it is when the first seed catalogues come with their insistent lure of the garden; then the garden impulse sets in, for it is a surer sign of spring than the bluebird. And yet there is but little garden work one can do outside, wherefore one turns to the labor of planning the garden and finds it fascinating. No insect worries the prospective garden, no drought assails it, and the gardener plans with joy in his heart and cheerful visions before his mind—waving tendrils of bean-vines swaying from their poles, stately mounds of squash, luscious, red-ripe tomatoes. Truly it is a pleasant season, that of the gardener with the first catalogues and the plan of his own garden! The weather outside may be as ugly as it pleases—he is quite content.

But aside from the pleasure of making garden plans when the garden season is "off" and one has leisure, there is a very real profit in doing this work at such a time. The gardener has leisure;

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he will put down beside each name in its proper place the planting directions for that vegetable; he will also space them properly on the plan. Then, if, instead of being stowed away, the plan is tacked in a convenient place, the gardener will find himself jotting down on its margin bits of information about his gardening he wishes to have ready at hand, such as that potatoes should be sprayed when 6 inches high, and that he mustn't hoe around the bean-vines when they are wet. Such notes require no effort whatever, but the gardener will find when planting-time comes, that instead of searching frantically for planting directions, he will have very clearly in mind exactly what he wants to do.

HOW TO PLANT

There is no arbitrary method of planting. The smaller the garden, the more interested will the gardener be that it should look well. Rows are more convenient than beds for plantings, because the wheel-hoe and the hand or horse cultivator can then be used. Anything that decreases the labor of the garden is worth while.

The rows should run north and south so that the plants may have the sun on both sides equally. Taller-growing vegetables such as corn and pole-beans should be at the north end so that they may not shade their lesser fellows.



Espalier cherries as a garden boundary

PLAN AND ARRANGEMENT

Spacing.—The spacing of plants is approximate, not arbitrary. If horse-cultivation is used, it naturally follows that the rows must be farther apart than when hand-cultivation is to be the order. Also, when the ground is very rich, planting may be closer. The distance between the rows is a matter of convenience in weeding and of the space required by the habit of the plant. If you find that your rows are too closely aligned then the obvious remedy is to thin, giving the plants more space in the other direction. Crowded plants do not develop well and the gardener must allow himself space enough to get about conveniently.

For detailed planting directions see pp. 99-129.

The following are the vegetables requiring plenty of room:

Lima Beans.—Hills 4 feet apart each way. Set poles before planting.

Corn.—Hills 3 feet apart.

Cucumber.—Hills 4 feet apart.

Eggplant.—Set out 2 feet apart one way, 3 feet apart the other.

Kohlrabi.—Set out 3 feet apart each way.

Muskmelon.—Hills 4 to 6 feet apart.

Watermelon.—Hills 8 to 10 feet apart.

Peas.—When sown in double rows should be 4 feet apart.

Potatoes.—Rows 3 feet apart.

HOME VEGETABLES AND SMALL FRUITS

Pumpkin.—Hills 8 to 10 feet apart (frequently planted in corn).

Squash.—Hills 6 to 9 feet apart. Bush varieties 3 to 4 feet apart.

Tomato.—Set out 3 to 4 feet apart.

VEGETABLES REQUIRING ROWS TWO FEET APART

Beans.—(Dwarf bush-beans and dwarf limas).

Beets.—Mangel-wurzel.

Broccoli (planted out).

Cabbage.

Cauliflower.

Celery (open planting).

Pepper (planted out).

VEGETABLES NEEDING BUT ONE FOOT OF SPACE BETWEEN THE ROWS

Asparagus (seed).

Beets.

Carrots.

Celery (seed).

Chervil, Chicory, Endive.

Collards.

Onions (seed and onion sets).

Parsley.

Rhubarb (seedlings planted out).

Salsify.

PLAN AND ARRANGEMENT

Spinach.

Swiss Chard.

ROWS 1½ FEET APART

Brussels Sprouts.

Parsnip.

Turnip.

The following may be sown in rows 6 to 8 inches apart, except where noted:

Broccoli.—Seed sown in drills 3 to 4 inches apart; transplant to 2 feet apart.

Carrots.—Earliest crop may be sown in rows 8 to 10 inches apart.

Corn Salad (Fetticus).

Leek.

Lettuce.—Rows 8 inches apart.

Radish.—Rows 8 to 10 inches apart.

V

COLD-FRAMES, HOTBEDS, AND THE SMALL GREENHOUSE

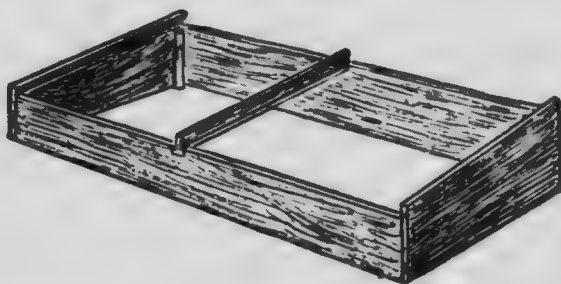
A very present help to the amateur gardener are cold-frames, hotbeds, and, in fact, any form of garden glass. In fact, the smaller the garden, the more imperative that some of its space be given to glass. "Sash" enables the gardener to get the utmost possible service out of every square yard of territory: it gives him two months of gardening before the season of outdoor planting begins, and when frost has laid low the outdoor garden, the plants under glass are as green as ever, and he proudly offers his guest home-grown salad at Christmas time.

THE COLD-FRAME

The simplest form of garden "sash" is the cold-frame. No extra heat is provided with the cold-frame, only the protection against cold which glass affords. It consists of a frame, like a box without bottom or top—four boards joined together to form a rectangle. This is laid on the ground. The back of the cold-frame is some 6 inches higher than the

COLD-FRAMES, HOTBEDS, AND GREENHOUSE

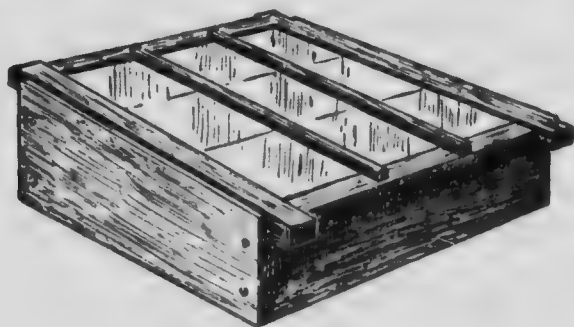
front, so that when the sash is laid on, it slopes like the slope of a low-pitched roof. The sash should fit closely. Sometimes the frame is just laid on the



A home-made cold-frame made to fit an old window-sash

ground, sometimes it is sunk about a foot in the ground.

Frames may be roughly made of converted packing-boxes, storm-windows may profitably spend



The "pony" frame

March and April doing service as cold-frame sash, old window-sashes may be used, and their vacant panes filled with muslin or oiled paper tacked in

HOME VEGETABLES AND SMALL FRUITS

place (if the storm-window or the ex-window-sash is used, then the frame must be made to fit the sash). But cold-frames can be bought so cheaply it is hardly worth while to spend the time in home manufacture. They may be bought complete, to be set up by the gardener, or the sash may be bought, while the frame is the product of home talent. The regular sash is 6 x 3 feet; cold-frames are made to hold one, two, three, four, five, or six sashes and are known as a two-sash, four-sash, frame. There are also "pony sash," half the size of the regular sash. The best sash is the double glass, which needs no protecting at night and simplifies work for the gardener.

HOTBEDS

In outward appearance, hotbed and cold-frame are alike; the difference is below the surface. For the hotbed a pit is dug 3 feet deep and the frame extends down to that depth. A hot-bed is usually made in two sections—the pit or subframe, merely a rectangular box without bottom or top, and the top frame exactly like the cold-frame which fits closely on the top of the lower section as the top of a sectional bookcase fits on the part below. Very often the lower section, or the whole of the hot-bed frame, is made of concrete. The pit-frame should be made of 2-inch lumber nailed strongly

COLD-FRAMES, HOTBEDS, AND GREENHOUSE

together at the corners. Strong posts, 2 by 4, are nailed inside the pit-frame; these project 4 or 5 inches, and to these the top frames are nailed.

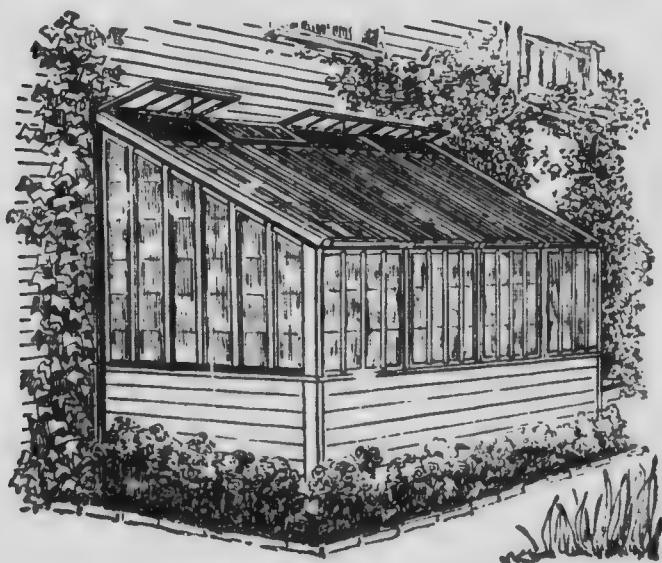
Into the pit of the hotbed is put fresh manure of the right temperature and over it the soil. So that the difference between hotbed and cold-frame is that of a furnace-heated house and an unheated one. Both cold-frame and hotbed are banked on the outside with manure or with soil for warmth and to exclude drafts. Both are used for starting young plants. Naturally the hotbed is the quicker. Naturally also, its infants are more sensitive.

THE SMALL GREENHOUSE

More satisfying than the cold-frame or hotbed is the tiny greenhouse. To the man or woman who loves plants and loves to work with them it is a source of constant happiness, and it is far more easily obtained than many garden-lovers realize. There are fascinating little houses, made of the regulation garden-sash for roof with "pony sash" for sides, houses that can be set directly on the ground while a sunken path gives the necessary height to the house, houses that can be successfully heated with a small oil-heater which can be bought for four dollars or thereabouts. There are small lean-to greenhouses, half the size of the little greenhouse which may be built against the side of the house,

HOME VEGETABLES AND SMALL FRUITS

and give a glass space 5½ feet by 12 feet. These little houses are built with detachable sash so that their roof and sides may be taken off to do duty



A lean-to greenhouse

as hotbed or cold-frame sash if the owner so desires. Or, if he moves, the greenhouse may be packed up and go along.

CARE AND PLANTING OF COLD-FRAMES AND HOT-BEDS

The best possible place for frames or hotbeds is in the sheltered angle of the wall of the house, or of an outbuilding where the frame will have a southern and southeastern exposure. If such a

COLD-FRAMES, HOTBEDS, AND GREENHOUSE

position is impracticable, a hedge or a fence may give the coveted shelter. The frame should not be close against the sheltering wall or fence, for access to the bed from all sides is convenient in caring for the young plants. Of course, the slope of the glass should be toward the sun.

For the amateur gardener or the man or woman whose gardening is done in spare minutes, it is wise to place the frames near the house, so that they may be cared for conveniently. Young plants require watchfulness, and it should not be necessary to make a pilgrimage to the far end of the garden to assure oneself that all is well with the plant infants in their nursery.

PLANTING AND CARE OF COLD-FRAMES

Outside, the cold-frame is banked for warmth. Within, the soil is treated exactly as is the soil for a seed-bed. The easiest way of preparing the soil is to remove the existing soil to the depth of a foot, and then fill in the frame with prepared soil. Equal parts of sand, leaf-mould, well-rotted manure and garden loam make an excellent soil. Or two parts of sand to one of leaf-mould and one of manure. No great depth of soil preparation is necessary, for the frame is chiefly used for seedlings whose roots do not go deep.

In the middle of the day, air should be given to

HOME VEGETABLES AND SMALL FRUITS

the plants by lifting the sash and placing a stick under it for support. As the weather grows warmer, more and more is the sash left off. In short, the treatment is much like that for human infants who are given an airing in pleasant weather, and loused in the inclement. For a time before the little plants are set out, the sash is left off completely—yet on a suddenly cold night, when frost threatens, it may be easily replaced. This process is called hardening off.

It is important for the amateur to remember that, in his first sowings, he must not plant all his glassed space, or he will have no place to which his tiny seedlings may be transplanted when the first thinning is necessary. If you have a three-sash frame, save two sash for transplanting. Of course, for vegetables which are not transplanted, muskmelons grown on inverted sods, tomato-plants in flats, this is not necessary.

Watering should be given with a fine rose-spray, and, contrary to the practice in outdoor gardening, where afternoon watering is preferred, water should be given early in the day, preferably before ten o'clock, when the plants are ventilated. Late afternoon watering is not good for the little cold-framers; it is too close on their closing-time and mildew is likely to result.

COLD-FRAMES, HOTBEDS, AND GREENHOUSE

MAKING AND PREPARATION OF THE HOTBED

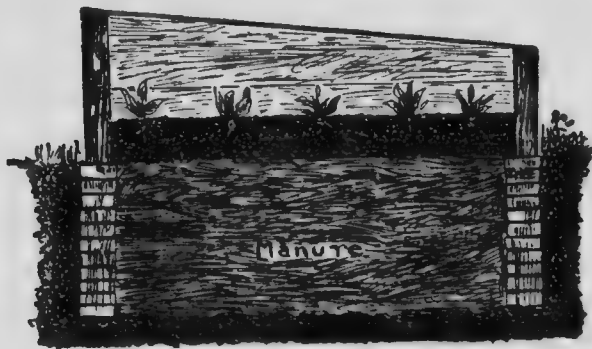
The size and the location of the hotbed should be determined first. Next comes the pit. This must be made wider and longer than the hotbed. A foot each way will give sufficient room for working. Then the subframe or pit-frame is put in. This should stand level. If the stout 2-inch plank of which it is made be treated with some preservative, it will insure its longevity. When the subframe is properly set, a layer of broken stone is filled in for drainage.

For the proper "cooking" of manure for the hotbed four or five days are necessary. It is first piled in a heap and allowed to ferment. Many growers, use a "filler"; that is, if the manure is free from strawy litter they mix it with half its bulk of dead leaves, on the ground that so supplemented (or diluted) it gives a more steady and more permanent, slower heat. A cubic yard of manure to a sash is the usual allowance.

For a day or two the temperature of the manure in the heap rises alarmingly, registering sometimes 110 degrees Fahr. Then it is forked over thoroughly to reduce its temperature and left piled again. After this second forking, two days should be allowed; then it may be shovelled into the hotbed. Fill the pit to within a foot and a half of the

HOME VEGETABLES AND SMALL FRUITS

subframe's top; then water it well and tread it down or persuade some one else to perform that useful but odorous labor, put on the sash and again the temperature will rise. From time to time take



Sectional view of a hotbed

its temperature and when it is down to 90 degrees then put on the top dressing of soil. This should be 8 or 10 inches deep, and in composition like the soil used for the cold-frame.

The care of the hotbed is like that of the unheated frames, except that the plants raised here are often "hardened off" in the cold-frames, before planting out, and since their climate is more tropical they are more sensitive.

PROTECTION OF FRAMES

If the hotbeds or frames are covered with double-glazed sash, no extra protection is necessary. If the single-glazed sash is used, then mats or other

COLD-FRAMES, HOTBEDS, AND GREENHOUSE

covering must be provided for cold nights. Old carpet will serve or mats filled with straw may be made, but greenhouse mats can be bought so inexpensively that if the gardener's time is of value, it is not worth while to make them.

SUMMER USE OF GARDEN-FRAMES

In the summer, the lath shutters which in winter are used to hold in place the extra covering, serve another purpose. It is from the heat in July and August that the small seedlings need protection, and with the shelter afforded by the lath shutter during the hottest part of the day, lettuce and other salad plants grow very comfortably.

VI

THE THRIFTY PRACTICE OF COMBINATION CROPPING

The most satisfying method of planning the garden is to make a list of those vegetables you would most like to have in it, and then find out if the desires are practicable. If they aren't, then find out what will be the most satisfactory substitutes. This method saves much regret.

In this matter of attaining large desires, in having what one wants in a limited space the practice of double cropping is of invaluable assistance. If the owner of a large farm gets two crops from his acres, it is even more imperative that the owner of few make his small territory yield its utmost. One authority figures that one square foot of land can be made to yield 3.8 cents, which when multiplied into acres give estimates alluring enough to set any one a-farming, but he may have reckoned without the middleman. At all events, double cropping and triple cropping become a study of fascinating interest.

There are two forms of double cropping.

One is known as companion cropping, the other as successive cropping.

COMBINATION CROPPING

In companion cropping, two vegetables are sown together in the same row, the one a very early, the other a late riser, so that the more sprightly crop is up and away before the other needs the space. Also, the first crop has broken the soil so that its slower fellow pushes more easily to the surface. Thus radish and parsnip are often sown together, radish and carrots, radish and lettuce, radish and parsley. Onions and leeks may be sown together and when the onions are harvested, the leeks are left for an autumn crop. This sowing together is the simplest form of double cropping, and the only extra labor involved is that of mixing the seed. The one planting operation does for both.

Another form of companion cropping is the practice of sowing between wide-spaced crops those which require less room or will be out of the way before the rightful owners of the space require it. Thus early peas may be sown 4 feet apart, and in the space between, two rows of spinach or radishes may be sown 1 foot apart. Both spinach and radish will be ready for the table before the peas; thus radish may be sown between the rows of string-beans, and lettuce between the early cabbages. Early cabbage may be set between tomato-plants; the former will be headed before the latter need the space. Sweet corn and summer squash may be grown together. It is said that the American

HOME VEGETABLES AND SMALL FRUITS

dish of succotash had its origin in the labor-saving practice of the Indian who planted the pole-beans near the corn, so that the vines might use the corn-stalks for their support.

SUCCESSIVE PLANTINGS

In succession crops the practice is different. Here the ground is cleared after the first crop, the soil dug and enriched and then planted afresh—a new beginning. The rule in succession cropping is that like must not succeed like. A leaf-crop follows root-crop, and a root-crop a leaf-crop, the third planting being a soil-restorer, such as beans or peas.

Here are possible successive plantings. Choose any one of the first, to be followed by any one of the second.

FIRST COMBINATION

First Planting.—Radish, leaf lettuce, spinach, green onions, mustard or cress.

Second Planting.—Tomato, peppers, eggplant (plants of these set out), sweet potatoes, squash, cucumbers, beans, sweet corn

SECOND COMBINATION

Choose one of first to be followed by any one of second.

First Planting.—Early cabbage, cauliflower, peas, beets, carrots, early potatoes.

COMBINATION CROPPING

Second Planting.—Dwarf string beans, late cabbage, late cauliflower, rutabagas, turnip, kohlrabi, winter radish.

THIRD COMBINATION

First Planting.—Bush-beans, carrots and radish, corn-salad, Swiss chard, spinach, peas, onions lettuce.

Second Planting.—Turnip, bush-beans, pole beans, New Zealand spinach, cabbage (plants set out), Swiss chard, spinach, celery (plants set out).

THE THREE-CROP COMBINATION

First Crop.—Leaf-lettuce.

Second Crop.—String-beans.

Third Crop.—Fall turnip.

First Crop.—Spinach.

Second Crop.—Early sweet corn.

Third Crop.—Fall radishes.

First Crop.—Green onions from seed.

Second Crop.—Pickle cucumbers.

Third Crop.—Fall spinach.

Sometimes gardeners achieve four crops on the same ground, but it is a very expert gardener and a mild climate that make such results possible. The companion cropping and two successive crops

HOME VEGETABLES AND SMALL FRUITS

are perfectly easy to manage. The planning is a little more difficult than for a single crop, but the practice is simple—when one crop is harvested, put another in. And if at the time of seed purchase the packets are divided, and those seeds for later planting stacked together in a large envelope, then, when the first vacancy occurs in the garden, the envelopes of the claimants for next planting are looked over and it is no great labor to decide whether one wishes to put in a second sowing of beets or to sow beans or sweet corn. Very likely in the cold-frames are young seedling tomatoes or eggplants demanding the next attention. Here are a few typical garden-rows, both crops grown on the same soil:

Green peas (early).	Bush snap-beans.	Beets.
Summer lettuce.	Kale.	Cauliflower.
Radish and lettuce.	Early corn.	Radish.
Sweet corn.	Lima beans.	Tomatoes.
		Cabbage.
Green peas.	Lettuce.	Parsley and radish.
Celery.	Beets.	Kohlrabi.

The above are typical combinations; there are many others which suggest themselves. Thus the beets which follow the early lettuce, if pulled and harvested in early August, might be followed by the pea Daniel O'Rourke, which will often mature before the season closes.



Closely planted and highly cultivated garden



COMBINATION CROPPING

The necessary factor in double cropping is that the soil be well fertilized and good cultivation given—this is only fair when extra demands are made of the soil, that it be recompensed for “overtime.”

When the gardener once gets the trick of it, the practice of double cropping is very good fun, and he will find it difficult to see a bit of land stay idle.

VII

FRUIT IN THE HOME GARDEN

No matter how small the plot there is space for some fruit. If no other room can be afforded, pear and apple trees (dwarf varieties of course) can be grown flat against the fence, espalier fashion.

GRAPES

Grape-vines can be trained against the house wall quite as easily as climbing roses. They thrive better on a trellis standing 8 or 10 inches out from the wall, but can be grown on a trellis directly against the wall.

One of the best remedial treatments for a too-narrow porch is to plant a grape-vine beside one of the pillars and then, by a 3-foot-wide bracket on which is laid a lattice or lateral strips of wood level with the piazza roof, and extending some $3\frac{1}{2}$ feet beyond it, make an overhead trellis. This, when covered by the grape-vine, affords much additional shade besides giving an effect of breadth to the piazza.

The wide, low grape-arbor of our great-grandmothers' time was a delightfully shady place where

FRUIT IN THE HOME GARDEN

odd bits of kitchen work could be done in much comfort, and when one considers the pitiless publicity attached to the average suburban kitchen-door some wisdom seems to be with the elders.



Grape-vine properly pruned

Grapes grown for shade and for house decoration do not produce the quality of fruit of those grown on grape-trellises and properly pruned and cultivated during the year, but yet their yield is considerable, and when the double service is given of shade and fruit there is much to be said in their favor.

HOME VEGETABLES AND SMALL FRUITS

The grape-trellis is an excellent division between flower-garden and kitchen-garden. If some space can be devoted to grape-culture, the trellises should be placed 10 feet apart, giving 10 feet between the rows and the vines set 8 or 10 feet apart. The best varieties are Concord, Catawba, Delaware, and of white grapes Niagara and Moore's Diamond. There are, of course, other varieties, but these are very dependable.

Grapes should be pruned in February or not at all. If pruned later, so that the sap runs, the vines bleed and more injury than good is done by the process. Cut back closely; the fruit is borne on the new growth and pruning increases new growth.

BUSH-FRUITS

The chief objection to raspberries and blackberries in the home garden is their prickliness and their habit of throwing canes across one's path like wire entanglements. If the gardener be feminine, this is a serious defect. It may, however, be met by proper staking—stout stakes set in the rows at intervals of 25 feet and between these galvanized wire stretched on each side the row, enclosing the canes and holding them fairly upright. Or, they may be set at the outer boundary and act as home-defense.

Rows should be 7 or 8 feet apart and the plants

FRUIT IN THE HOME GARDEN

set 4 or 5 feet apart in the row. The young raspberry-suckers come up between, making the row shortly a solid phalanx. Pruning is done in the early spring, and properly equipped for it, with stout leather gloves and good pruning-shears, it is not an unpleasing job, and the row, when one has finished with it, looks so amazingly tidied that it is quite worth the trouble. Cut back the last season's growth to 2 or 3 feet. The other pruning-time for raspberries is after the crop has been gathered. As soon as the old canes are dead, they should be cut out, leaving 4 or 5 good canes to each hill. The point to remember in raspberry-growing is that the canes, once having fruited, are done for and are of no further use except in the compost-heap. The next year's crop is from the young wood.

One of the best varieties of red raspberries is the old Cuthbert.

Blackberries.—The care of blackberries is essentially the same. Their fruiting-season is a little later. Blackberry-vines make a very decorative showing when grown against the wire netting of the chicken-yard, and they thrive amazingly in that modest situation.

Currants and *gooseberries* should be in every garden—the gooseberries will thrive in partial shade. Currants are very beautiful both in flower

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and fruit, and very much prized by the housewife. Their method of growth is different from that of the raspberries but their culture is easy. The fruit of the currant is borne on the old wood, not on the new; therefore, in pruning, the old wood is at first left alone, and the new shoots thinned, leaving only two of the strongest. Later, when the plant is perhaps four years old, two of the old shoots are removed every year, two new ones being left to take their place. The new shoots are shortened in, of course, and the head kept open as if it were a tiny apple-tree. Dose with Paris-green and Bordeaux to head off the currant-worm, and you will have little difficulty in growing currants. Five feet apart is their proper planting distance, and if the soil be well enriched, vegetables may be grown between.

The culture of gooseberries is practically the same, except that these have a tendency to send up suckers and require more pruning to keep the desirable "open head." Gooseberry, currant and other berry bushes may be trained in various shapes. (See Chapter VIII.)

STRAWBERRY-CULTURE

Strawberries.—One of the most interesting of crops for the small place is the strawberry-bed. Like asparagus-growing, strawberry-culture seems more difficult than it is—in point of fact, it is simple

FRUIT IN THE HOME GARDEN

compared to raising cabbages and meeting all of their enemies. Most of us are so accustomed to sowing, watching for the young plants and then eating the fruit—and all in one season—that the need of planting one year for a crop the next seems an undertaking, and yet it isn't. Get pot-grown plants and set them out in late August or September; these will be in fruit the following June. These plants will send out "runners"—adventurous young strawberry-plants, at first merely a rosette of leaves attached to the parent plant by a slender stem. These are made into pot-plants by sinking a flower-pot, taking up the small rooted plant and setting it therein, leaving the young plant still attached to the parent. The plants from runners are set out in late August for the next year's strawberries—and so on. The strawberry-bed is something of a peripatetic in the garden, and the few pot-grown plants bought in the beginning increase enough to keep up the supply for oneself and one's neighbors.

Strawberries require good soil, preferring a sandy loam or a light clay loam; they also like plenty of moisture. Planting out must be done carefully; the strawberry roots spread out—they flare, as it were, so that a straight, deep hole such as that made with a dibble does not accommodate them well; the hole should be amply wide and if a little cushion or mound is made in the centre—and the crown

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of the plant set upon this, the roots may be comfortably spread out. Fill in partly with soil, then fill the hole with water; after this has settled, fill in with soil and press down firmly. The rows should be 3 feet apart, the plants a foot apart in the row.

The culture is simple. The plants should be well-established by October when they should receive a good mulch of manure; wait until the ground is frozen before putting on the rest of the winter covering, which should be of leaves or straw held in place by boughs. This covering must be removed early, otherwise the plants, being overheated, will have too much of a start and be unable to endure the change in temperature. As soon as growth has started, lift the covering from the crowns; later, at the time of first planting, lift all the covering, cultivate thoroughly, working in wood-ashes and bone-meal—the preferred diet of the strawberry. This cultivating done, the wise gardener covers the soil, putting a mulch of hay between the rows, lifting the leaves of each plant, slipping the hay under, so that when the fruit comes it will have a clean cushion to rest upon.

After fruiting, runners begin. Select the number from each plant that you need, pegging the stem down, if you choose, to expedite matters. The superfluous runners should be cut off. In late August or early September transplant the new

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little plants to the spot chosen for next year's strawberry-bed.

"Imperfect" varieties of strawberries must have a "perfect" blooming variety plant next them or no fruit will set. Varieties that are not self-fertilizing are called "imperfect."

An interesting border to a flower-bed may be made of strawberry-plants, set one foot apart and kept carefully free from runners. So grown, they will produce well without transplanting several years in succession.

VIII

THE MINIATURE ORCHARD

No gardener is really happy without a hobby and by far the most fascinating hobby for the suburbanite, or even for the city-yard gardener is the growing of dwarf fruit-trees.

Probably this art was practised in Babylon, certainly in England it is centuries old, and in Japan it goes back a thousand years or more. In America, however, it is almost unknown. Just what it is that has hindered the growing of dwarfed trees in this country it would be hard to say. Finger-skill and the exactness of knowledge which are necessary in the training of the dwarfed trees are rather lacking among us Americans; also it took us years and years to find out that the repeated failures in this country of fruit-trees grown as in England, against walls, could be avoided if the trees were trained on a trellis some 3 inches out from the wall, thus affording room for a circulation of air.

The present wave of gardening enthusiasm, especially of enthusiasm for small gardens, should bring the dwarf fruit-tree into its own. Certainly there are many reasons why just now they would be

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peculiarly welcome. In the first place, most of the amateur gardeners, those whose efforts are confined to a small acreage, are women; although women are very much interested in having apples and pears and plums and grapes a-plenty for canning and preserving and for table use, yet the growing of standard trees, the establishment of a sure-enough orchard, is an undertaking that requires many acres—the work of spraying and of picking is formidable especially with an uncertain labor market, and the average feminine suburbanite does not wish a formidable undertaking: she wishes no larger garden than she can care for comfortably herself, with perhaps the aid of a handy man—so she plants one or two fruit-trees and that is all.

There is another reason for the dwarf orchard which must appeal peculiarly to the dweller in the rented house—namely this: These little trees come into bearing in two years. It is therefore not long before Madam Suburbanite has the benefit of them, and if she wishes to move, she can have her little orchard dug up, stowed in a truck or wagon, transported to her new home, and there planted again, none the worse for its experience. Nay, rather the better for the root-pruning.

For the home gardener, the dwarf tree has multitudinous advantages.

Firstly, the fruit itself is notably superior in color

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and quality. *Secondly*, the tree comes into bearing so very much more quickly than the standard (early maturity being a characteristic of all dwarf trees). *Thirdly*, its soil requirements are less. Take "the poorest soil you can find" writes Doctor Thornton in his charming little manual of dwarf fruit-growing, in speaking of the preferences of the dwarf plum. *Fourthly*, the care is in reality simpler. One can get at the dwarf tree. Skill and knowledge in pruning and training are necessary, but the matter of spraying, the constant watchfulness for insects—these are much more easily compassed when the tree is 4, than when it is 40 feet high. One may even put a veil of netting over the head of a diminutive cherry-tree to keep off the robins, while to attempt this for a standard would be by no means so easy. Spraying may be done with the aid of a knapsack sprayer, and because the little trees are so completely under observation, there is little chance for any wicked insect assailants to take the citadel unawares. And although to the uninitiated the art of pruning and training these tiny fruit-trees seems a bit occult, in reality the rules are few and simple, and perfectly easy to follow.

And finally, as the preachers say, the use of dwarf trees enables the suburbanite to have a wide variety of different sorts of fruits, a complete succession of pears and plums and apples, and all in the space

THE MINIATURE ORCHARD

that would be occupied by one good-sized tree; and lastly, purely material considerations would give the preference to the dwarf tree over the standard. On the 40 feet square space which a standard apple-tree requires of which the average yield is 50 bushels, enough dwarf apples can be grown to yield 150 bushels.

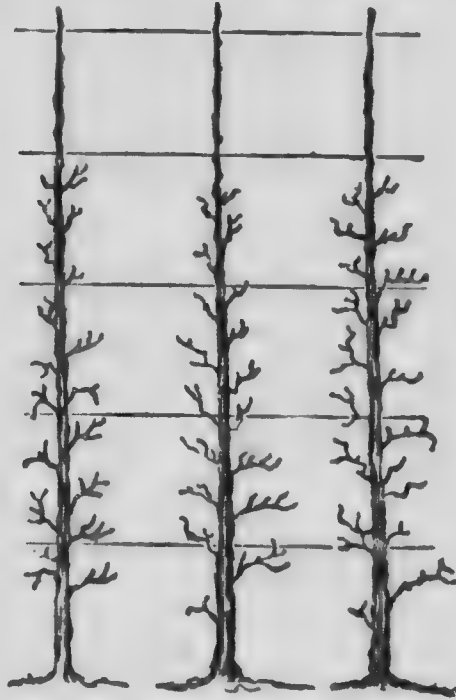
There are, besides, many charming uses to which the dwarf tree may be put. One may make fences of them, growing the little trees in cordons, vertical or oblique; one may use them for garden divisions; one may trim the trees exactly and use them in strategic positions in the garden as standard roses are used. A currant-bush grown in tree form makes a very decorative little tree both in flower and fruit, and so trained is well worthy of a garden position. Besides these more or less material advantages, consider the pride of the amateur gardener when he brings in and sets on his table a small, potted cherry-tree or plum-tree in blossom or in fruit!

These little trees have always been the darlings of the horticulturist, and as year after year the home gardener trains and tends them and leads the young shoots exactly where he wants them to go, he comes to regard them not so much as profitable garden-stuff, but as pets, on whom any attendance is a pleasure, and he takes utmost delight in showing them off.

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WHAT YOU CAN DO WITH DWARF FRUIT-TREES

The Cordon.—To grow the greatest possible amount of fruit from a small space, use the cordon. Plums, apples, and pears do well so grown, but espe-



Upright cordon

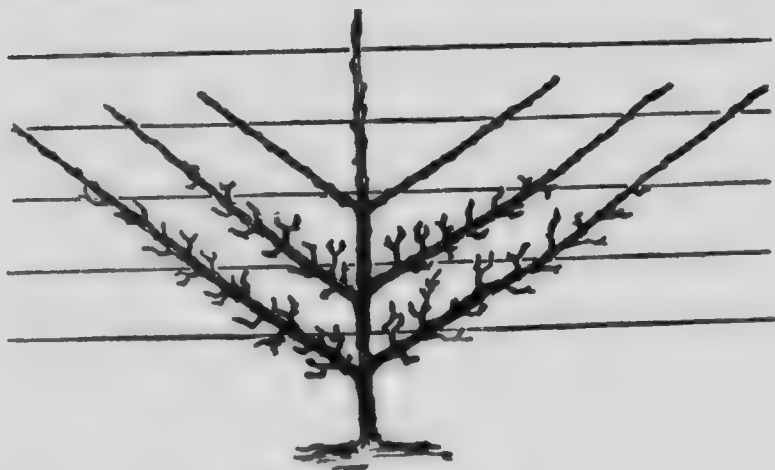
cially apples. These should be grafted or budded on a very dwarf stock, known as Paradise. Plant the trees a foot and a half apart and then train to a single stem against tightly strung wires. Pinch back the side shoots and shorten the leader every



Espalier apple-trees make a dainty division of property

THE MINIATURE ORCHARD

summer. This treatment encourages the fruit-buds to develop properly. Instead of training in the perpendicular cordon, the oblique cordon is sometimes preferred and the trees, still kept to a single



Espalier in palmetto form

stem, are tied against the wire at an angle of about 40 degrees—each tree at the same angle.

Diamond Cordon.—This is made by training the tree (preferably dwarf apple) in a double cordon—a V form, instead of the single stem. The trees are set 18 inches apart, the supporting horizontal wire so spaced that it crosses at the intersection of the branches. The diamond latticework thus made is a most interesting garden division or fence, and lovely when the trees are in bloom.

Horizontal Cordons are used for making a very

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pretty low fence or border. The trees are placed 6 or 8 feet apart. A line of wire is stretched horizontally about 15 inches above the ground. The



Pyramid form

young apples stand erect until they reach this wire; they are then bent and tied along it, very much as *Wichuriana* roses are sometimes trained, and when the tip of one tree reaches the stem of the next the old art of "in-arching" may be practised and the tip of the one grafted into the other.

Cordon Gooseberries.—

This is a very attractive and eminently thrifty way of growing the gooseberry. Set the plants 9 inches apart and

train to a single stem, like the upright-cordon apples. So grown they will bear profusely.

Espalier Trees.—In training, these are simply a variation of the cordon. They must be trained against wires, or against a trellis set 3 inches out from the wall. Single perpendicular cordons are

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the quickest way of covering a wall. The V form used in the diamond fence, may be elaborated into the palmetto form, and instead of a single upright other branches may be trained, first horizontally for 6 inches, then upright. There should be 6 inches between the upright branches.

Pyramids.—This is used when trees are grown in the open. They are easily so trained. Thin out the side shoots in June, and shorten in the autumn



Goblet form

as is usual with dwarf trees. Peaches are very pretty grown in this shape; they require, however, more space. Eight or 9 feet is none too much.

Goblet Shape.—Trees grown in this form have an open centre. Six or 8 outer shoots are used to make the “goblet” or “vase.” These are at first trained to stakes; later the tree is perfectly self-supporting. Apple-trees are charming trained in this way, especially at blossom-time.

Bush Form.—This is much used for pears and cherries grown commercially. The pruning of these is not such a fine art—simply the shortening in

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necessary to preserve the dwarf character and the necessary thinning. Bush Dwarfs require more space.

THE TRAINING AND PRUNING

The whole success or failure with dwarf trees lies in the pruning. All fruit-trees that bear their fruit on spurs will form fruit-spurs if in summer their shoots are cut back to a half-inch, or if they are pinched back to three leaves. It is most important that this be done in the summer. In training for the cordon Doctor Thornton gives the following directions: (Presupposing that the trees are set out in the autumn.) "If your maiden tree" (*i. e.*, tree one year after grafting) "has been cut back before you receive it, it will require no further pruning that winter: in the spring shoots will start from the graft bud, of which you will select the most-upright-growing and tie it to a stake as it grows. In June you will cut back all side branches to 1 or 2 inches: in August pinch back any shoots that have made five leaves to three leaves, and continue each winter cutting back the leader within one or two buds of the last fruit-spur, and keeping all side shoots cut or pinched back through the summer. Remember the cordon is simply a straight stem without any branches, only leaves and fruit all along its length." Whatever form of growing

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is chosen, the principle is the same, and the method of pruning consists, as above stated, in keeping the little tree strictly to the business of producing fruit, not branches. Peaches, nectarines, and apricots, however, bear their fruit on the new growth, therefore more of it must be let remain and the cutting-back must be done after fruiting. Never pull off a leaf. Snip with scissors, or pinch with thumb and finger just below the rounding out of the leaf. Thus growth is checked, yet there is no breaking at the precious fruit-bud.

The diagrams given here show Doctor Thornton's method of training the young trees, one of the clearest for the amateur to follow.

PLANTING DISTANCES

Apples, pyramid or bush, root pruned, 6 feet.

Espalier on Paradise stock, 12-14 feet.

Upright cordons, 2-3 feet.

Oblique cordons, 2 feet.

Apricots, on walls, 20 feet.

Cherry, as bushes or pyramids, Mahaleb stock,
root pruned, 9 feet.

Espalier for walls and fences, 15-20 feet.

Upright cordon, 2-3 feet.

Currants, cordon, 9 inches.

Gooseberries, cordon, 9-12 inches.

Nectarines, on wall, 15-20 feet.

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Peaches, on wall, 15–20 feet.

Pear, bushes and pyramids, on quince stock, 9 feet.

Half standard on pear stock, 12 feet.

Upright cordon, 2–3 feet.

Horizontal espaliers, 20 feet.

Upright espaliers, on quince, 4 feet.

Plum, pyramid, 9–12 feet.

Espalier on walls, 20 feet.

PLANTING AND CARE

Autumn is the best time for setting out a miniature orchard; the young trees can become established and start the season none the worse for their change of habitat. Have the hole amply large, and do not leave the young tree exposed while making ready a place for it. The hole should be dug before uncovering the roots. Hold the tree upright, spread out the roots and work in the soil about them. When the hole is half filled, pour in water and let it settle. The soil must be pressed down very firmly, but keep it loose and light on top. These things have been said repeatedly, but yet need to be repeated, for the neglect of proper planting works havoc with the little orchard.

Preparation of the Soil.—On a small place, trenching is by far the best preparation of the soil. If the ground is fairly rich, no manure need be added. If it is poor, some well-rotted manure may be worked

THE MINIATURE ORCHARD

in when planting. If commercial fertilizer is given, it should be of a sort that contains but little nitrogen, for nitrogen induces the growth of leaves, rather than fruit production. The following is Professor Waugh's formula for a tonic best suited to dwarf fruit-trees, reduced to "suburban" terms. For 100 square feet of land set with dwarf fruit-trees, it may be thus approximated:

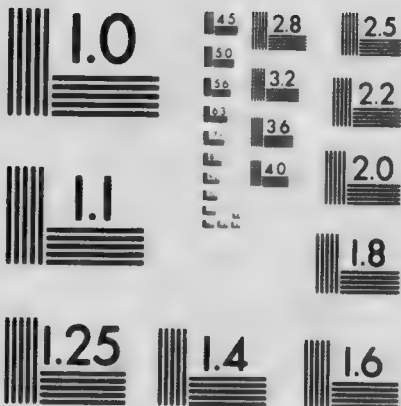
For plums and peaches, newly planted: One pound ground bone, 1 pound muriate of potash, $\frac{1}{4}$ pound Peruvian guano.

For plums and peaches in bearing: One pound ground bone, $1\frac{1}{4}$ pounds muriate of potash, $\frac{1}{4}$ pound Peruvian guano.

For apples and pears in bearing, the formula is the same as for plums except that 1 pound instead of $1\frac{1}{4}$ pound of the muriate of potash is used. Spread on the ground in the winter. A mulch of manure in the winter is beneficial.

Root-Pruning.—This is another branch of education which is important for the success of the dwarf tree. The development of a compact and restricted root system is very important. If each year the gardener digs half-way around the little tree, thrusts in a sharp spade perpendicularly and cuts the outer roots, thus making a complete pruning every two years, it is usually sufficient. Some horticulturists lift the little tree, clip the roots a little and replace





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it, but expert horticulturists are able to do things to trees at which the amateur gardener would shudder.

Any one who wishes to engage commercially in growing dwarf fruit should read Professor Waugh's book on the subject, and also Doctor Thornton's quaint and delightful little "Suburbanite's Handbook." It is a most fascinating amusement—the care and tending of the little trees. The high food value of fruit, and the importance of having it fresh and perfectly ripe make the planting of a miniature orchard a worthy use of space for even the most thrifty of gardeners.

IX

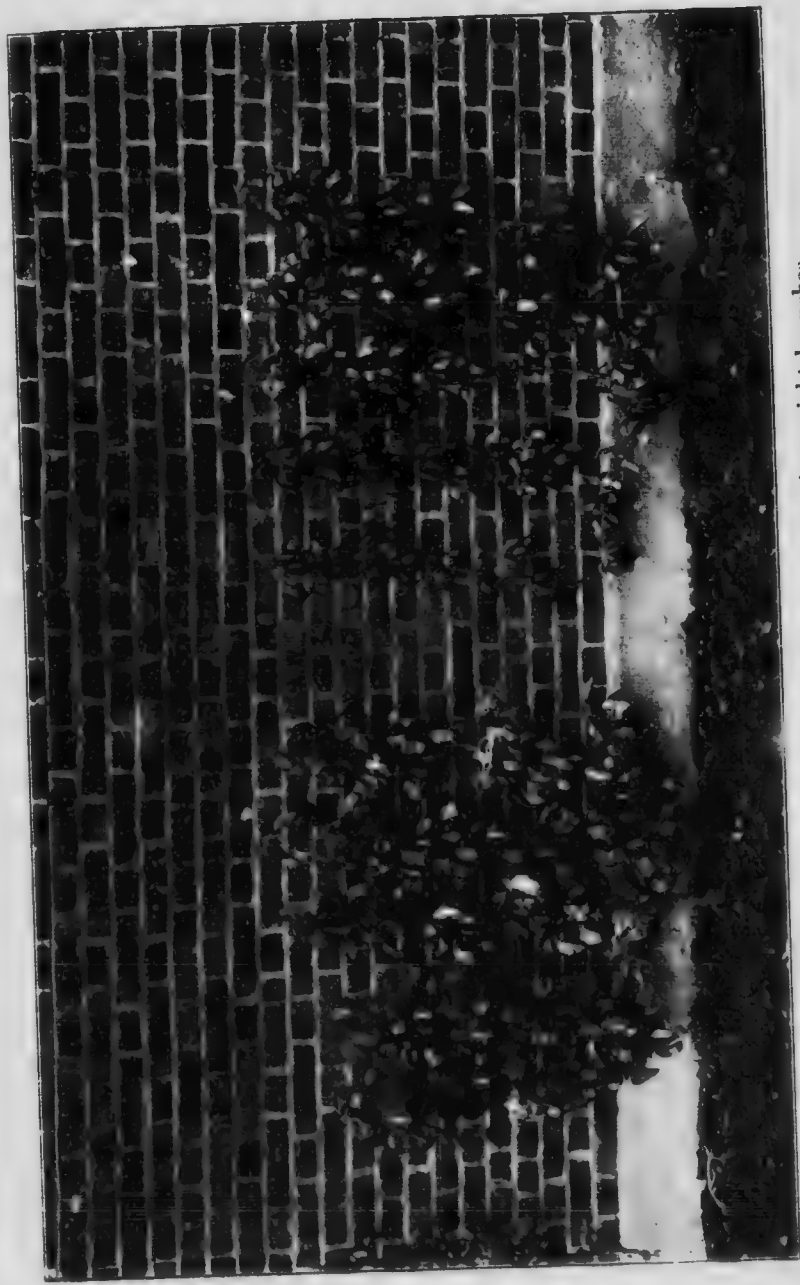
THE KITCHEN-GARDEN IN TOWN AND SUBURB

The town gardener's point of view is different from that of the farmer. To the city gardener, space is of great value; every inch of his small territory must be put to the best possible use. Soil also is of enhanced value, for the soil for his 2-foot-wide bed may have been brought in by the bushel and paid for accordingly. Another consideration for the town gardener is the nearness of the market; he therefore studies to avoid growing those crops he can obtain easily and that would take a long time to grow, and confines his gardening to those crops which it is a peculiar enjoyment to have fresh, or from his own garden. "To supply a family of six" which is the usual aim of a garden in the suburbs, is out of the question for a tiny city yard. Here the most important thing is that the gardener should grow what he wants.

And tastes differ; therefore the tiny city gardens are likely to be highly varied. Corn, cabbage, cauliflower, melons, are ruled out because of the space they require.

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Yet if the city gardener chooses, he can grow tomatoes against his fence, trained as he would train a climbing rose, or he can train them to stakes and arrange them so that they suggest standard roses. He can grow currants as standards, and dwarf fruits against his wall. He can grow pole-beans on a trellis against his fence, or let them climb his clothes-poles and make arches from the clothes-poles to the fence. He can even train squash-vines to climb against his fence, and they will give a handsome mass of foliage and keep clear of his path. Especially he will plant the crops it is good to have near at hand, and which it is a pleasure to go and fetch from his own garden instead of from his ally (or competitor) the greengrocer. He will have salad plants a-plenty, new and interesting varieties of lettuce. He will have endive and romaine, and tie the endive properly for blanching. He will have a plant or two of green peppers and eggplants, one or two green onions from sets which seem almost to grow overnight and which the unlearned will take for daffodils. He will have parsley and mint and thyme, perhaps a bit of the "blue-flowering borage" of Browning's Karshish—and an exquisite blue it is—together with marjoram and dill and sweet basil in his tiny herb-bed. If he likes rhubarb, he will have a single plant of it, large as it is—and if he doesn't he won't. So that, tiny as



Pears grown as espaliers. Six inches between the upright branches



THE KITCHEN-GARDEN

the garden is, it may be resorted to as a definite and a daily aid to the larder, which is a happier state than if all the effort and all the space be concentrated on a single crop.

Pony frames, or portable cold-frames the town gardener will be sure to have, which will extend his gardening into the winter. Probably he will mix both flowers and vegetables, and have lettuce and pansies or violets growing in his frames. He will experiment with starting such crops as beans under glass, eggplant, pepper, possibly celery, as well as the usual early crop of radish and lettuce and beets and early carrot. It is the proprietor of the tiny garden who will have the glass bells, in common use abroad, and which in effect are tiny portable greenhouses, minus the extra heat.

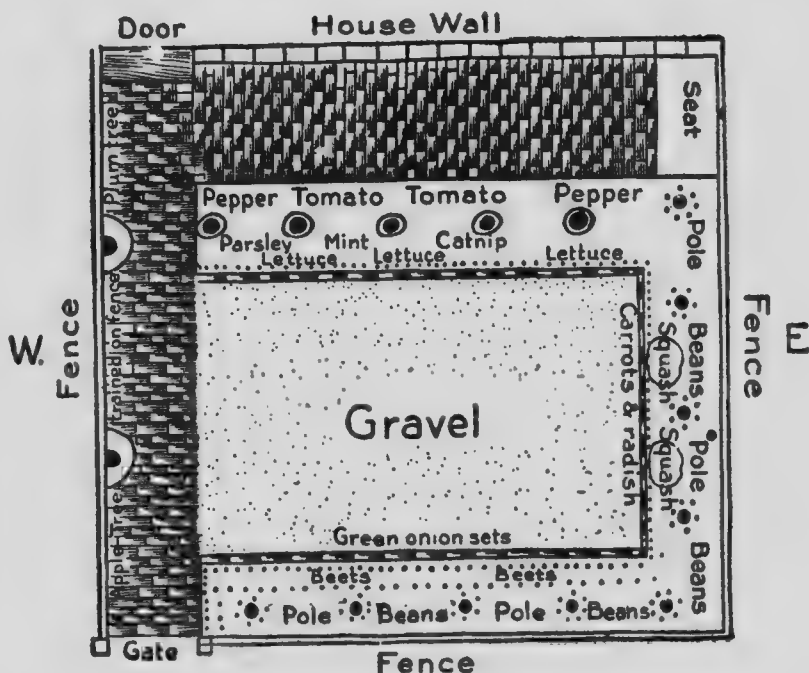
The use of these glass bells is like that of the portable frames. They are removed in the milder middle of the day, and replaced toward evening, until the weather is warm enough to leave them off altogether. A half-dozen bell glasses give an extremely professional look to a garden; besides, the small plants underneath are not in the least hidden.

Even a tiny garden affords room for the exercise of whatever garden fancies the owner has. Thus a man whose interests lie that way may have a potato-pen for the chief *objet d'art* in his garden, and grow bushels enough to last him well into the

HOME VEGETABLES AND SMALL FRUITS

winter. Another may grow celery according to the so-called "new culture," which puts an astonishing number of plants into a 10 by 12 space,

N.



S.

Plan of a city-yard garden twenty feet by fifteen feet

packed close like sardines in a box, and all he needs for this is a cold-frame in which to start the seedlings, very rich soil, and a hose-connection which will enable him to give them all the water they need, for celery-plants so grown are especially heavy

THE KITCHEN-GARDEN

drinkers. The plan given is of a tiny garden in which the owner has sown what he wanted.

A gardener whose tastes and digestive interests run less to vegetables may like to grow against his wall or fence apricots or nectarines, and have in his yard a tree of the Japanese plum, which is extremely easy to grow. He may grow a grape-vine against his house, have a dozen or two of strawberry-plants, and a border in his little 2-foot-wide bed and ulips beneath them; he will have a quince and 3 or 4 currant-bushes, and, for the rest, nial roots or annuals and vegetables tucked in wherever there is space for them.

THE ROOF-GARDEN

Aside from planting in the yard, many highly successful city gardens are made on roofs. These are, of course, all "made" gardens, for which the soil must be brought; but they have the advantage of more air and sunlight, and, although the soil be scant, it is clean and wholesome and not permeated by gas. A box two feet wide and a foot deep running the length of the roof will afford a chance for quite a little successful gardening. It should be remembered, however, that plants so grown require much more water than when grown in Mother Earth—even the Mother Earth of so hard-hearted a bosom as she has in a city yard. Tomatoes and pole-beans

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on a trellis, peppers, lettuce, and "greens" of all kinds are adapted to roof-garden culture.

Some day we shall take a garden lesson from ancient Babylon and devote, as a matter of course, the roofs of our city houses to garden enterprise, cover them with earth enough to make possible the growing of dwarf fruit-trees, and make of them in the winter a garden living-room, glassed over for the inclement weather.

The city gardener has much to contend with, yet he has this to reassure him that, if he can solve the questions of soil and adequate moisture, he has probably less to contend with in the matter of insect enemies. Most of those that try the soul and patience of the farmer are from his enterprise far afield. Also, there is more satisfaction to be had in a large achievement on a small field than in a small achievement on a larger field.

X

THE SUBURBAN GARDEN

The small garden in the suburb or in the village can be a most delightful place, and if the gardener follows Doctor Johnson's advice about reading and makes his planting "what he wants," it will be full of individuality.

The chief difficulty of the city gardener—sour, ill-smelling, and gas-permeated soil—is not his difficulty. Yet the suburbanite in a newly built section may suffer from the contractor's habit of burying the good soil and putting over it a yard of hard-pan. In which case he must bring good soil from elsewhere (good muck may often be had for the bringing), and be content slowly to get his soil into good condition.

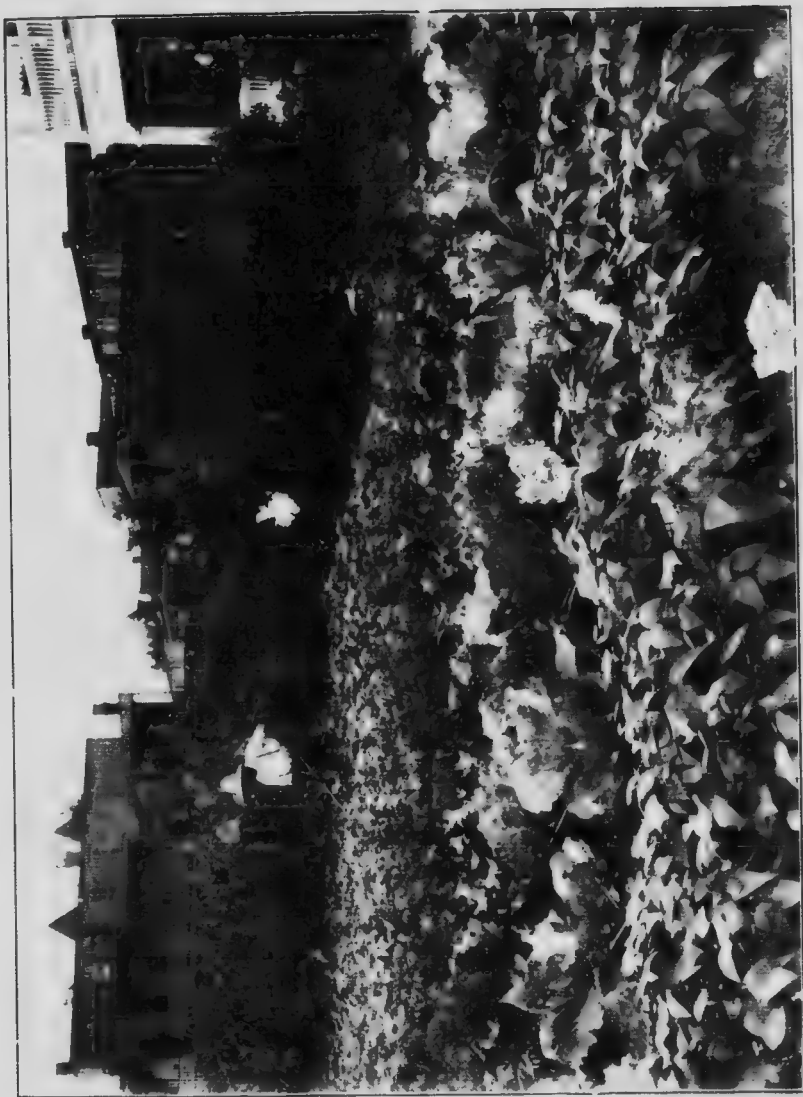
It lies within his power to have a garden which, although small, may be complete and well-balanced enough to provide, if necessary, a goodly portion of the food needful for the "family of six." One of the most valuable parts of the training in some of the English schools of horticulture is in the making of the "cottage garden," a quarter-acre plot planted with fruit and flowers and vegetables,

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both selection and care of which is the pupil's work.

The aim of the cottage gardener who owns his place is to make a permanent garden and year by year to add to the permanent planting until the little place becomes very complete. If the place is not large enough for fruit-trees of standard size, even close-set, as a windbreak, then dwarf trees can be planted. A fruit and flower garden makes a delightful combination—it is an old combination but a charming one. Peaches or pears or apple-trees in flower with at their feet *Narcissus poeticus*, daffodils, or pink-flowering cottage tulips, make as lovely a setting for a garden as one could wish, and also a very poetic boundary, and one with which the crustiest neighbor would find it hard to be offended. Also, such a planting occupies very little space—a 3-foot-wide border-bed with the trees set close to the boundary would suffice. Consider, too, how very encouraging it is to work in the kitchen-garden of a spring morning, digging or raking or marking the rows for planting the worthy and homely beets or carrots with so much beauty for encouragement. And if the robins eat the early cherries, they were pleasant company and perhaps may let alone the later ones.

Currant and gooseberries and a strawberry-bed should be part of the garden's equipment. Grape-



A midsummer garden



THE SUBURBAN GARDEN

vines can be grown against the outbuildings, beside garage or stable, or, if there is a convenient place, a grape-arbor is a pleasant asset. It is well for the housewife to reflect that a cool and shady place to sit out-of-doors may make the difference between the cook's staying or leaving. And if the garden be a tempting place, neither cook nor household will object to frequenting it and bringing in fresh vegetables. Therefore, if possible, have a grape-arbor and have a wide, long table in it where vegetables may be looked over, picked over and washed before bringing them into the kitchen.

Another of the permanent features is the asparagus-bed. Once started, the care of this is slight, and the man of the house who may resent weeding, not infrequently really likes to cut the asparagus; there is just enough skill involved in the operation to make it interesting, and the basketful of fresh, green-tipped stalks represents a very tangible gardening achievement very easily won.

The herb-bed should be near the house—this is another permanent feature, since most of the herbs are biennial or perennial. Cold-frames and hot-beds should have a convenient place and be easy of access.

It will save much labor and greatly increase the garden's efficiency if a convenient arrangement for watering is secured. A stand-pipe with a hose is a

HOME VEGETABLES AND SMALL FRUITS

luxury, but, whatever the method, to be able to give plants water and plenty of water when they need it is taking out for the garden a goodly insurance policy.

The choice of vegetables is, of course, the choice of the individual gardener. A typical cottage garden would have asparagus, radishes, and parsnip, early turnips and early beets, onion sets, spinach, parsley, carrots, early peas (4 feet apart), onions from seed and lettuce between the rows. Next planting would be of cabbage and cauliflower and later peas, together with radish and lettuce for succession. Then come string-beans and early corn, dwarf lima beans and pole-limas, tomato-plants and eggplant. A garden 25 x 50 feet should give room for these.

The arrangement is a matter of individual choice. Have your plan and mark down where the vegetables which require the most room are to go; put the others in where convenient. If the pre-diary is kept as suggested elsewhere, then whenever a crop is harvested, whether it be early peas or a single row of lettuce, the gardener has before him the "waiting list" of possible candidates for that space and it is not difficult to make a choice. Rows should run north and south, and for cultivation long rows are more convenient than short ones.

On the plan should be marked the first crop and its successor; for instance:

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"Early peas, to be followed by second plantings of beets and carrots." Rows of parsnip, the slowest of the slow in coming up, may be marked by a row of radish that will be up and eaten before the parsnips show their heads. This may be indicated on the plan and so much of gardening done before even a crocus or its humble contemporary but boldest of vegetables, the skunk-cabbage, has had the courage to appear.

Seed may be ordered at the time of garden-planning and it is no small satisfaction to have that much of the gardening ready.

Here follow the approximate quantities necessary for a garden 50 x 50 feet.

For the amateur it is safer to buy plants of tomato, cabbage, cauliflower, eggplant, peppers, and to set out asparagus-roots and rhubarb-roots, rather than to attempt raising these from seed. One spares oneself quite a bit of disappointment by refraining from attempting the difficult, and putting in one's energy where it is surest to count.

The list given here is suggestive merely; half the fun of gardening lies in making the plans oneself.

Beans.— $\frac{1}{2}$ pint of bush-lima, $\frac{1}{2}$ pint Sure-Crop Wax, 1 pint Kidney Wax, 1 pint Brittle Wax, $\frac{1}{2}$ pint Lazy Wife (pole).

Beets.—1 ounce each of Detroit Dark Red and Half-Long Blood (for winter).

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Cabbage.—2 dozen plants each Large Late Flat Dutch and Succession Improved (Thorburn, $\frac{1}{2}$ ounce seed).

Carrots.— $\frac{1}{2}$ ounce each Danvers Half-Long and Chantenay, also 2 packets Parisian Forcing, Early, for late crops.

Collards.—1 packet Georgia.

Corn.—1 pint each Golden Bantam and Country Gentleman.

Corn-Salad.—1 packet.

Endive.—1 packet Green Curled Winter.

Lettuce.—1 packet each California Cream Butter, Simpson Black-Seeded, May King, and one of the best of the Cos varieties (Romaine), Red Cos.

Onions.—1 packet Yellow Globe Danvers and Red Wethersfield.

Parsley.—1 packet.

Parsnip.—Hollow Crown, 2 packets.

Peas.— $\frac{1}{2}$ pint Thomas Laxton, Gradus, Daniel O'Rourke, 1 pint Little Marvel.

Potato.—Green Mountain or Rural New Yorker, $\frac{1}{2}$ peck.

Radish.—2 packets White Chinese and Black Spanish, 1 packet Round Scarlet China.

Spinach.—1 packet Prickly or Winter and Curled-Leaf Savoy.

Tomato.—2 dozen plants Red Rock, Livingston's Globe.

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WAR-TIME GARDENS

Some very clever and complete little gardens were the result of the unusual garden activity stimulated by the war, and the very real dread in the mind of each housewife that unless she went a-gardening she might not be able to provide for her household.

The spring of 1917 saw garden clubs that hitherto had devoted themselves exclusively to "de luxe" gardening—to competitions in dahlias and roses and gladioli—become passionately concerned instead with the needs of homely onion and cabbage and the demands of the worthy potato. The high prices which prevailed all summer, the threatened food shortage, were like a furthering gale which kept full the sails of garden enthusiasm.

Of course, there were plenty of instances where beautiful lawns, the result of years of care, were ploughed up to give place to a planting of potatoes, managed with more zeal than knowledge, so that the chief crop was experience. The most successful of these little gardens were made where real co-operation was secured and a thrifty and energetic garden club stood ready to aid the individual effort. Of the gardens near New York, the clubs at New Rochelle, organized by Mrs. Van Etten, and that at Flushing organized by Mrs. John Paris,

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show what excellent results can be obtained in the individual garden with the stimulus and backing of a garden club.

The moral of which is, that if you are really interested in making your gardening successful, get one or two neighbors to go a-gardening too. Even a very little comparison of experiences, of talking over books that have been helpful, is wonderfully stimulating and may save the making of many a serious mistake.

Herewith is the result table (see page 81) from the record of Mr. Charles Hodges' very successful little garden in Flushing, done in a space about half as large as a tennis-court. Mr. Hodge's garden is a spare-time garden, so that the cost of labor does not enter into it.

Aside from monetary results, the first green peas are perhaps the proudest achievement of the amateur gardener, who, if he can distance his neighbors by a week or even a few days considers his reputation as a gardener made. Next to this, the proudest moment is that when he exhibits his first personally grown strawberries. Never were any like them in the market, and who that has experienced the thrill of picking his own production would tamely purchase his strawberries from an unfeeling greengrocer?

Fruit-growing is one of the forms of garden-craft



A highly productive war-time garden
(Mr. Charles Hodges', at Flushing, N. Y.)



QUANTITY AND VALUE OF VEGETABLES PRODUCED ON A PLOT 32 x 50 FEET—1,600 SQUARE
FEET OR A TRIFLE MORE THAN ONE-HALF THE AREA
INSIDE THE LINES OF A TENNIS-COURT

AMOUNT OF VEGETABLES PRODUCED UP TO DATE,* SEPTEMBER 25, 1917			ESTIMATED ADDITIONAL VEGETABLES UP TO FROST			
NAME	QUANTITY	PRICE	VALUE	QUANTITY	PRICE	VALUE
Radish.....	44 bunches.....	3 c.	1.32	20 bunches.....	3 c.	.60
Lettuce.....	32 heads.....	10 c.	3.20			
Spinach.....	58 quarts.....	15 c.	8.70	12 quarts.....	15 c.	1.80
Peas.....	37 quarts †.....	15 c.	5.55			
Beets.....	110 bunches †.....	10 c.	11.00	15 bunches.....	10 c.	1.50
Carrots.....	53 bunches.....	10 c.	5.30	10 bunches.....	10 c.	1.00
String-Beans.....	72 quarts.....	15 c.	10.80	40 quarts.....	15 c.	6.00
Onions.....	2 quarts †.....	5 c.	.10			
Cabbage.....	13 heads.....	10 c.	1.30			
Tomatoes.....	487.....	2 c.	9.74	600 §.....	2 c.	12.00
Corn.....	453 ears.....	3 c.	13.59			
Eggplant.....	43.....	15 c.	6.45	6.....	15 c.	.90
		Total	\$77.05		Total	\$23.80

REMARKS: * Final total, \$100.85, or 6.3 c. per sq. foot. † Only fair crop. ‡ Beet-tops for greens not estimated.
|| Crop failure. § One-third of these will probably be picked green.

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that requires intelligence far more than brawn. It is a type of gardening peculiarly inviting to those who have neither time nor inclination for the steady all-summer work that a complete vegetable-garden requires. Nor should it be forgotten that fruit has a high food value. That custom of our ancestors of planting orchards and vines as soon as they set up their homes had much to recommend it.

Once the gardener tries it, fruit-growing has a peculiar fascination. There is in it the zest of a constant striving after perfection, and such a tangible perfection! Such beauty of foliage and richness of color and flavor are possible! Even considered as a business venture and not as an art, the prices obtainable for really beautiful fruit are such that the wonder is more amateur gardeners do not try growing it. The scarcity of home-grown fruit in our suburbs is curious and only explicable on the ground of our American unwillingness to plant a crop for which one must wait two or three years for the reaping. The blossoming apple and cherry and plum trees are adorable in the spring, and give a touch of homelikeness and friendliness to a place that nothing else can give—"the kindly fruits of the earth," says the prayer-book: "preserve unto us the kindly fruits of the earth so that in due time we may enjoy them."

XI

A CHAPTER FOR THE BELATED GARDENER

The foolish virgins of to-day receive more consideration than those historic ones. If they forget the oil for their lamps, very likely some convenient, complaisant shop will be open where they might, it is true, have to pay a slight advance in price, but still the oil can be had at the eleventh hour. So with eleventh-hour gardeners; their habits are known and their necessities make a definite market demand which is met by canny growers. Strawberry-plants may be bought in pots ready to set out. Cabbage and cauliflower, tomato and eggplant, celery and young melon seedlings may of course be bought from growers, and, when set out, will prosper as serenely as if the home gardener had himself personally conducted each through its helpless infancy.

Besides those gardeners who are belated by temperament, there are also those so circumstanced that they cannot go a-gardening before late June or even July. Yet, even with so tardy a beginning,

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much gardening is possible and many a crop can be brought to maturity.

In the first place, no matter how belated the gardening, one should always give the soil the best preparation one can manage before planting. If all cannot be done, use the instalment plan; then give good preparation to part of the garden and plant that, then dig and thoroughly prepare another. If the soil preparation for the first crops was scanty or hasty, before planting the second dig and enrich the soil; in fact, whenever there is the chance to dig a garden-bed, enrich the soil at the same time. Unless very well rotted manure can be obtained, the belated gardener should dig in a little commercial fertilizer at planting time. A trowelful each of wood-ashes and bone-meal when setting out plants will greatly assist their growth; so will a little chicken manure dug in about the plants. Liquid manure is a boon to the tardy gardener, for both moisture and nourishment in an available form are given to the plants. Manure improves the texture of the soil as well as adding humus, but the nitrogen it contains is released rather slowly; therefore, if you cannot manure early, use some commercial fertilizer, nitrate, bone-meal and wood-ashes.

Besides preparing the soil, or possibly while this is being done, the canny belated gardener will can-

THE BELATED GARDENER

vass the neighborhood and diplomatically call upon his friends, "flat" in hand, to see if he may find recruits for his garden. During the entire summer gardeners are thinning and transplanting, and it is frequently quite possible to obtain dozens of little plants suitable for setting out, although they may no longer be on the market. Cabbage, cauliflower, eggplant, beets, lettuce, young peppers, tomato-plants, and many others may be had as late as July first, if the gardener goes in person and takes them away himself. (A garden club can give a most useful service to the community by having a Secretary of Exchange, to whom members send word of surplus plants which may be had for little or nothing by any gardener who wants them.) Seedlings transplanted at this time must be given especial care and shielding, after setting out, from the sun (p. 87).

Sowings which can be made as late as July 1 are these: Beans, bush-lima and pole sorts; beets (Crimson Globe)—soak the seed overnight; carrot; sweet corn—such varieties as Golden Bantam and Country Gentleman; cucumber—cool and crisp, for pickles; corn-salad, cress, endive, Siberian kale, and kohlrabi; lettuce—May King or White Summer Cabbage (summer-sown lettuce should have partial shade and plenty of water); early peas, such varieties as Telephone and Daniel O'Rourke; pumpkin and squash, spinach and early radish—French

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Breakfast or Parisian Early Forcing; turnip—Early White Milan—for the season's use, and rutabaga for winter storage.

As late as August the following may be sown: Beans, dwarf bush, corn-salad, cucumber (pickle) endive, lettuce, early peas (O'Rourke), winter radish, spinach and turnip for winter.

If the gardener prudently confines his efforts to what he can raise in the brief time allowed him instead of attempting what he can't, even a belated garden will, before the season is over, present a very creditable appearance and be of real use besides. Meantime the thrifty gardener will study soil preparation and get beautifully ready for next year.

XII

GARDEN HANDICRAFT

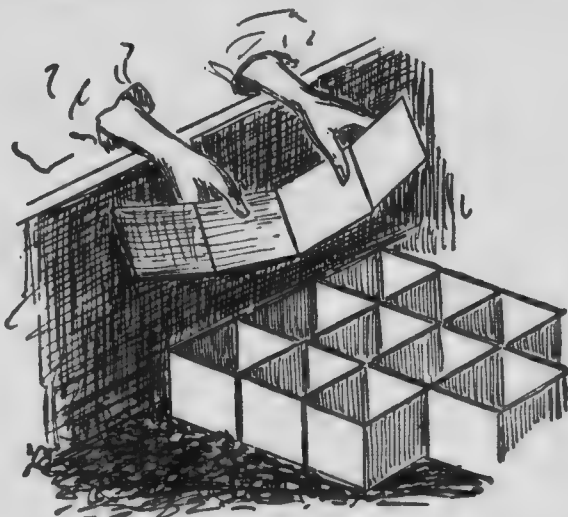
Much of garden work is handicraft pure and simple, and the success depends on how well it is done. It profits the gardener little to buy the finest stock obtainable if that stock is improperly planted, the sensitive little roots suffered to dry out, the watering of baby seedlings neglected.

TRANSPLANTING

One of the most important gardening operations is transplanting. Transplanting seedlings is spoken of casually enough, but it needs more care than any other process in gardening. The essential point for the amateur to remember is that roots are delicate and most sensitive; that a plant with its roots exposed enjoys the situation about as much as a fish enjoys being out of water. To experienced gardeners a tenderness and really exquisite care in handling roots is second nature, just as a nurse handles a baby deftly and carefully—no other way is possible. Exposure to air and to sun is disastrous; “drying-out” is almost always fatal. The essentials are simple—that the roots be kept covered

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and moist and cool—but these are essentials. In planting, the hole should be deep enough and wide enough so that there is no crowding; the soil should be sifted gently about the roots, then filled in,



Placing dirt bands in a hotbed

pressed firmly down and thoroughly soaked with water. For several days newly transplanted seedlings should be kept shaded and very moist.

“When two or three leaves have formed” is the proper stage in the development for moving the plant babies. By this is meant not the first leaves which in many plants are more or less alike, but the two or three true leaves by which even a novice can tell if the little plant be a young beet or a small cauliflower.

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To "prick out" the seedlings, as it is called, grasp with thumb and forefinger the tiny plant just where the leaves start, the strongest part of the plant. With a pot-label or some other small flat implement in the right hand the young plant is loosened from underneath and lifted without breaking the roots or



Lifting melon-plants from the hotbed

dislodging more soil than can be helped. The little seedlings are then laid side by side in a tray or flat box with a little water in the bottom, if the box will hold water; if not, and if many minutes must elapse before they are set in the ground, a little damp earth is thrown over the roots. To lift out more seedlings than can be set out directly, is malpractice in gardening.

planting, the seedling is held in the same fashion, between thumb and forefinger, in its proper position, the roots dangling over the hole, which is amply wide and deep; the fine earth is then sifted

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about it, pressed down firmly, watered thoroughly, and the little plants are kept shaded and very moist for several days.

AIDS IN TRANSPLANTING

Expert gardeners have always at hand various devices for protecting the infant seedlings from the sun. Any method may be used that is convenient and answers the purpose, each gardener will have his preferred way. Whatever the method used, it is very necessary that newly transplanted stock be not subjected to the strain of hot sunshine.

Market-gardeners, when transplanting their young beets or celery, invariably reduce the tops by chopping the heads squarely off to reduce the leaf surface. It is for the same reason that newly transplanted trees and shrubs are cut back.

Many vegetables which benefit greatly from transplanting are yet so sensitive that gardeners resort to all sorts of means to perform the operation without their being aware of it. The common practice of starting melon-seeds on inverted sods is one of these. The sod, with its group of little melon-seedlings, can be carried far and set out in a distant hill without the little melons realizing that they have been budged. Another method of treating melon-seedlings is to sow the seed in "flats" and then make what are called earth bands, dividing

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the soil with heavy paper or cardboard cut and locked together as it is in boxes in which eggs are carried. This divides the soil in the flat into many small square compartments, each of which



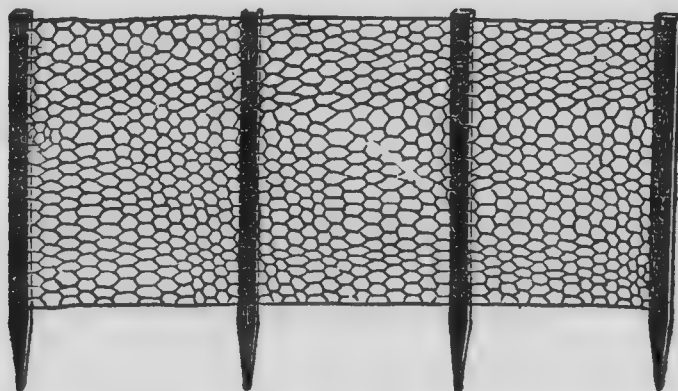
A tin can, the bottom and seam of which have been unsoldered; used as a guard against cutworms. The seedling in it is ready to be slipped off into the hole

at transplanting time can be lifted out entire with a pancake-turner, a child's sand-shovel, or some such implement, with its complement of young melons intact.

Celia Thaxter used to start her seedlings in eggshells. The paper pots obtainable in any seed house are excellent for the purpose. The seeds are planted in these, and when setting-out time comes, either the pot is loosened and the plant slipped out, or else the plant is set out, pot and all, trusting to

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the weather and soil to disintegrate the pot. Tin cans make admirable seedling nurseries. They are prepared for this use by heating the can until the solder melts and the bottom drops out and the side



Convenient support for peas. May be used for several seasons

opens. Tomato-plants are often started in these, the can held together with a string, while the young plant is starting. These tin "containers" are especially useful for tomatoes because the tin wall surrounding the young plant serves as a defense against cutworms and it is left around it until this danger is passed.

TYING AND STAKING

Although transplanting is the most important bit of garden finger-craft, there are many others, apparently of slight importance, which yet have much to do with the welfare of the garden.

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In staking and tying it is imperative that the circulation of sap in the plant be unimpeded. Therefore strips of cloth are much better than string, and raffia is far better than wire. Many a fruit-tree has lost its life because its owner has not noticed how tightly the wire label was twisted around its stem and allowed it to cut the bark completely, girdling the tree. These labels should always be looked at to make sure that they are not injuring the tree or plant. At the nurseries these are twisted on very casually just before the plants are packed, merely as a means of identification, with no idea of permanency.

STAKING TOMATOES

In staking tomatoes, the chief point is that the vines have adequate support and that the tomatoes are kept off the ground.

Begin training tomatoes early. Either provide supports or train them to a single stem; the latter method is far more elegant, but requires a deal of "pinching back." So far as I have been able to discover, the difference between pinching back and pruning is that if you can nip off the superfluous branch with your fingers, that is pinching back; if you use a knife or pruning-shears, it is pruning.

One of the best and the newest ways of staking tomatoes is to train them to stakes or to a trellis;

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in this way the fruit gets the greatest amount of light and sun. Set 6-foot poles at intervals of 2 feet (bamboo-poles may be used). With heavy



Tomato-plant pruned to a single stem
and supported by a stake

twine tie across, lattice fashion, at distances of 6 inches. Tie the straight, upright stem to the pole, using cloth, not a string. When four or five side shoots have appeared, choose the two strongest, pinch off the others, and tie these horizontally, as grape branches are tied. Trained in this fashion, tomatoes may be planted much more closely, and give a very decorative effect; besides, they can be cultivated much more conveniently, and there

is, in a wet season, far less danger of the fruit rotting. The tying of tomatoes so trained should be seen to once a week.

Bean-poles should always be set before the beans

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are planted and the brush or whatever support is used for peas should be set up just after planting that the young vines be not disturbed.

TYING FOR BLANCHING

When the cauliflower heads are nearly formed, in order to have them of the desired whiteness, the outer leaves are brought together and tied, leaving plenty of air-space beneath but yet forming an umbrella which keeps the sun from the centre, insuring the proper complexion. The outer leaves of Romaine lettuce and endive are tied in the same fashion for blanching. The labor of this is very slight and the improvement in the appearance makes the slight trouble very well worth while. Endive should be dry when tied for blanching and only a few plants at a time should be so treated, since it is likely to rot.



Cauliflower tied up for blanching

Celery is blanched differently. The plants are grown in a trench and "earthed up" gradually, or

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planks are set on edge on each side of the row of celery and the earth drawn up against these. No earth should be allowed to get down into the heart of the celery, where it causes decay.

Setting out seedlings from the hotbed or cold-frame should be done on a cloudy day. Also the little plants should have been "hardened off." On warm days the frames should be left open, then just before setting out they should be open altogether, only having the sash covers on an extra cold night. Hotbed plants are often "hardened off" by a short sojourn in the cold-frames, where the climate is less tropical. With plants raised in boxes indoors, the same process is followed; the boxes are taken out-of-doors in mild weather and for a few days before planting out, left out altogether.

In setting out tomato-plants it is wiser to plant 4 or 5 inches deeper than the plant stood in the hotbed. This saves the trouble of hilling up also; as roots are thrown out from the buried stem, it makes the plant stronger.

Flats.—It is for the reason of convenience in handling that seedlings are grown in flats. These are shallow wooden boxes 2 feet long, a foot wide, and 2 inches deep. They are easily handled, can be moved about in the hotbed or cold-frame so that all the seedlings get the same development; they

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are also of a size convenient to pack away and store.

Pinching back, usually recommended for vegetables that have grown fast and not set many fruit-buds, is exactly the same as "cutting back," "reducing the top," or the pruning of newly planted trees; it is called pinching back when the growth is slender enough for the operation to be performed with thumb and forefinger instead of pruning-shears. Tomato-plants produce the more for having the ends of their branches nipped off or "pinched back." The runners of squash-vines should be "pinched back"; so should bean-vines that

have grown past the top of the pole. It checks the growth of the plant in that direction and sends the strength to the growth already made.

These are a few of the more important details of garden handicraft, a form of "first aid" which every gardener should know. There are, of course, the pruning of fruit-trees and bushes, grafting and



Cutting back or shearing the plants (celery)

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budding and methods of propagating, but these belong to more expert gardening and should be given in more detail than the scope of this book warrants.

XIII

PLANTING AND CULTURAL DIRECTIONS

In sowing seed, four times the depth of the seed is the rule for covering. Do not sow too thickly. Fine seed, even, should have space each side so that the tiny plant can start. A little practice enables one to sow evenly and rapidly. Take the seed in your hand, *do not* shake from the packet. Seed should be watered thoroughly and pressed down firmly with a board or the foot. Quick-growing seeds like radishes are mixed with those of slow germination, like parsnip, or asparagus, to mark the rows. Quantities given are for a family of five.

Artichoke, Globe.—Sow early crop in March indoors, late outdoors in April or May; seed should be sown in shallow rows, seedlings transplanted to rows 3 feet apart, plants 2 feet apart in the rows. Early crop will ripen in September, later may be used the next season. Plant roots deeper than they stood before.

Artichoke, Jerusalem.—Plant in April or early May, cutting tubers to 2 "eyes," setting them 2 inches deep, rows 3 feet apart, hills 2 feet apart; ready for the table in August.

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Asparagus, once planted, is the easiest of vegetables to care for, and, although the making of an asparagus-bed requires care and some degree of exactness, it is reassuring to remember that one's labor may last for thirty years. Asparagus needs rich soil and good drainage. If the natural drainage is not good, then drainage should be provided.

In making an asparagus plantation either one or two year plants may be bought; one-year-old are preferable. If not in haste, one may grow his own asparagus-roots, sowing the seed in early spring, rows 18 inches apart, thinning when the seedlings are up to stand 3 inches apart. Since the asparagus is slow in germination, sow radish to mark the rows. Cultivate like seedling onions. The next year the asparagus plantation may be started.

Planting methods: After good manuring, deep ploughing, thorough harrowing and disking, make furrows 10 inches deep and 4 feet apart. Plant the roots in the furrow so that the crown will be 6 inches below the ground level; cover about 2 inches deep. For the home garden, the most convenient and also the safest way to prepare an asparagus-bed is to dig a trench 5 feet wide, 2 feet deep, and as long as you intend the bed shall be. A trench of this width holds three rows of asparagus. Put in a layer of drainage material, broken stone, or coal-ashes, then a layer of well-rotted manure, a little complete fer-

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tilizer, then the soil, which should be rich with fine, well-rotted manure, some bone-meal or complete fertilizer added also, and the whole made fine and well worked together. In planting the roots, each outer row should be a foot from the edge; this will make the centre row 18 inches from its fellows. Do not fill up the trench before planting; the root-buds should stand 6 inches below the level and the roots should be set 2 feet apart. Cover to the depth of 2 inches, press down firmly, and as the season progresses fill in the trench until it is level with the surrounding garden. Keep the soil free from weeds and hoe about the young plants, drawing the soil closer to them as they come up. At the end of the season the trench will not be evident, the ground being level with the surrounding garden. In the autumn a dressing of manure should be given after the feathery tops are cut down. This should be worked into the soil in the spring, and since the roots are so deep, the cultivator may be run cheerfully over the whole plantation as if no plants were there, but this work should be done at the earliest possible moment in the spring.

Cut lightly the first season; the next year the cutting-period may be longer—a well-established bed should stand cutting every day for eight weeks. After cutting is over, cultivate, give liquid manure—a tonic that has been well-earned and then let

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it blossom. The feathery green is a charming background for garden-flowers; do not allow the seed-pods to ripen—which they will proceed to do, if permitted, into tiny scarlet berries. Cut down the asparagus and, instead of putting on the compost-heap, burn all the branches as insurance against rust.

Basil, Sweet.—Sow in March; transplant to rows in the herb-bed 8 inches apart, plants being 8 inches apart in rows. Fragrance like cloves; cut down just before blooming; dry the leaves and bottle. One packet of seed is enough.

Beans.—This crop should not be sown out of doors until the weather is warm and settled, and danger from frost past. About the first of May is the time in the latitude of New York, and thereafter for a succession at intervals of two weeks. A deeply dug, rich soil is best for beans, and for a very early crop in a sheltered situation do not use fresh manure; wood-ashes or bone-meal are better fertilizers for this crop. Later varieties give a longer yield than early sorts.

Bush-Beans.—Sow in rows, 2 inches deep; the seed should go “eye” down and the beans an inch apart in the row; thin to stand 1 to 2 feet apart in the row. Rows should be 2 feet apart. One pint of seed is enough for 50 feet. Among the best varieties are Bountiful, Refugee, Hodson Wax, and Kid-

PLANTING AND CULTURAL DIRECTIONS

ney Wax. Bush-beans may be sown until August; for the last plantings use early varieties.

A 50-foot row of Hodson Wax and a 75-foot row of Bountiful should yield sufficient. Do not sow all at once; make sowings, alternating varieties, sowing every two weeks from May 1.

Cultivation should be thorough during the early season; later little is necessary and bean-vines when wet should be let alone.

Beans, Lima, or Pole-Beans.—Limas should not be planted until warm weather has begun fairly; other pole-beans may be sown from the first part of May. Plant poles first, 3 to 4 feet apart each way. Sow the beans, eye down, 2 inches deep, and 8 or 10 to a hill, thinning later to 4 or 5. Bush-limas should be sown in rows 2 feet apart and thinned to stand 18 to 20 inches apart in the row. If extra-early limas are wanted, start them in the cold-frame in April on inverted sods, transplanting when the weather is settled. Plant 18 or 20 hills. One-half pint seed is enough for 25 hills. A 30-foot row should be enough and one of the best sorts is Burpee's Improved.

Beets.—One of the early crops; sow as soon as the ground can be worked and afterward every two weeks for a succession until July. Soil should be light and fine and well pulverized—beets do not object to a sandy soil. Sow in rows 1 foot apart,

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thin to stand 4 or 5 inches apart, using the thinnings as "greens." For this purpose they should be pulled when the beet is the size of a hickory-nut. Use beets for a "follow-up" crop after early peas or beans or lettuce. Eclipse or Crimson Globe are good varieties. Two ounces of seed is enough for 100 feet. Make four sowings, one a month, from April. Store in sand or pits for winter.

Borage.—Sow in seed-beds in May or April; transplant seedlings after six weeks, setting in rows 1 foot apart. Sow at intervals; leaves, when young, may be used as spinach; scent and flavor like cucumber. One packet of seed is enough.

Brussels Sprouts.—Culture like late cabbage or cauliflower; very hardy; one of the best winter vegetables; should be touched with frost before picking. May be sown in open ground in April, May, and June. Twenty-five plants early, 75 plants late. Two packets L. I. Half-Dwarf.

Cabbage.—Early cabbage should be sown in the hotbed in February or March, or it may be sown in a seed-bed in late March. Cabbages need plenty of room and a small quantity of seed only is necessary, for each seed means a good-sized cabbage. One hundred plants are enough surely, and one packet each variety enough. One ounce seed gives 1,500 plants. Copenhagen Market and Drumhead Savoy are good sorts. Sow the seed a half-inch deep and be sure

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to give plenty of ventilation. Early cabbage should be ready to set out in the garden in May. The soil should be rich and heavy, but well drained. Make the rows 2 feet apart and set the young plants 12 to 18 inches apart in the rows. In transplanting, cut off part of the outer leaves and plant deep—the cabbage has not an extraordinarily strong neck, and the heavy head should sit right on the broad shoulders of Mother Earth.

The cabbage-worm may be dealt with in various ways—he will be sure to be met, and the young plants are safer with tobacco-dust sifted over their heads as soon as they appear; this deters the turnip-flea.

Late Cabbage is sown in late May or early June in the open ground. In July the seedlings are transplanted; they should be protected from the sun for a few days unless heaven blesses the gardener with cloudy weather. Winter cabbages may be stored and kept successfully all winter. (See p. 163.)

Carrot.—Sow as early as the ground can be worked and for main crop in May to mid-July. Sow in late July and early August for winter. Rows 1 foot apart. The soil should be light and rich and well dug. Thin the early carrots to stand 4 or 5 inches apart in the row; the baby carrots are excellent eating. Later carrots should stand 7 or 8 inches apart. The best varieties are Chantenay,

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Danvers Half-Long, and, for early carrots and very late and for growing in hotbeds or cold-frames, Parisian Forcing, Early. One-half ounce of carrot-seed is enough for 50 feet of drill. For winter use, store in sand or in pits.

Cauliflower.—The culture is the same as for cabbage, except that additional manure is valuable and that the cauliflower likes more water. When the heads are beginning to form, tie the outer leaves for blanching (p. 95). Seventy-five plants are enough. One packet Dwarf Erfurt.

Celeriac.—A form of celery with an enlarged root, especially valued for soup-flavoring and for its excellent winter-keeping qualities. Sow in April and transplant to the garden later to stand 8 inches apart in the row. Soil should be kept well cultivated and well enriched. Erfurt Giant is a good sort.

Celery is not difficult to grow once the gardener understands its requirements and meets them. It likes a light, rich soil and plenty of moisture; it demands "personal work" on the part of the gardener—two transplantings, and then the "handling" as it is called, incident to blanching, yet the personal work is not arduous and finely grown celery is a crop to which any amateur gardener points with pride. There are two crops, the early celery, which is eaten as soon as grown, and the late celery, which is stored and kept for winter use. From the

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time of sowing to the time of setting out are three months of infancy for which the gardener must provide. As to its garden space, it may be a follow-up crop, profitably succeeding early peas, or the young plants may be set out between rows of corn which will be out of the way before banking of the celery is necessary, or it may go between grapevines; it does not object to slight shade.

Sowing: Make five or six holes in the bottom of a shallow (3-inches-deep) wooden box or flat; fill with soil, part sand, part leaf-mould; water with a fine spray; sow the seed thinly in rows 2 inches apart; put the box in a warm, light window or hot-bed if it is late January and the celery be early celery; if it be late celery and the time March or early April, place the box indoors in a sunny window or in a cold-frame. Keep the young seedlings moist—two or three weeks are required for germination. When two or three true leaves are formed, “prick out” and transplant to other boxes, setting the plants 3 inches apart, or (which is better) set out in paper pots; these should go in the cold-frame. When the celery is large enough to transplant, which in the early crop should be early May, transplanting should be done with as little shock to the roots as possible.

Setting out: A shallow trench is one of the most practical methods for a small garden, or the trench

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may be made like a sunken bed wide enough to hold from two to four rows a foot apart. The beds should be rich with well-rotted manure, the plants set about 8 inches apart in the row. When planted the whole bed is 6 inches below the garden level. As the plants grow the soil is drawn up around them and at the end of the season the "earthing-up" process shows them, not in a trench, but in small windrows, only the green tops protruding.

Earthing up must be done carefully. If you can, secure an assistant, so that one of you can hold together the outer leaves, so that none of the soil gets into the heart, while the other draws up the soil about the plant; this is called "handling." Plants grown in a sunken bed or trench may be wintered where they stand, earthed up, then covered with hay or leaves, with boards laid on top to keep the covering in place (p. 95).

There are many excellent varieties. It is best to get a self-blanching sort. Golden Self-Blanching and *Fin de Siècle* are good. One packet of each is enough.

NEW CULTURE OF CELERY

If the gardener has very rich soil, plenty of water, and a good garden-hose at his disposal, he will want to try the "new culture" for celery. This is a most convenient method for the gardener with the tiny

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plot. He devotes to his celery plantation a space, say, 10 feet square. This is made very rich. The celery-plants are then set out in rows only 5 inches apart and but 4 inches apart in the row. They are then given abundant water and cultivated only with hand-tools. The theory is that, with the close planting, the tops will make a close roof and the blanching will take place without any further measures on the part of the gardener. A board, set on edge, is laid at each side of the little plantation so that the outside row will be blanched also. The celery thus cared for looks as if it were growing in a large cold-frame. Do not forget that it requires a plentiful supply of water.

Chard.—Sow a 25-foot row. One packet Giant Lucullus is enough. Culture like beet.

Chervil.—Grow in the herb-bed and cultivate like parsley.

Chicory (*Witloof*).—Same culture as endive except that it should be banked in autumn, like celery—drawing up the earth gradually.

Chives.—Propagated from division of roots like garden pinks. Cut the leaves as needed. Excellent for flavoring.

Collards.—Culture like cabbage, but easier: Sow seed in June, July, and August. When about a month old, transplant. Rows should be a foot apart, plants a foot apart in the row. Cultivate often.

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Corn.—Sow about May 15 in rows 2 feet apart, or sow in hills, 5 or 6 kernels to a hill. The soil should be rich and light. Cultivate often, drawing the soil up to the stems; break off side shoots. Corn-roots are near the surface, so that cultivation with a hoe must not be too enthusiastic; a rake is a better implement or a hand-cultivator which will give thorough but shallow cultivation. Corn should be sowed every two weeks for a succession until July 15. Among the best varieties are Golden Bantam, Stowell's Evergreen, and Country Gentleman. One pint each of two varieties will give 200 hills. Make eight sowings, 25 hills each time.

Corn-Salad.—The best time for sowing this convenient little salad-plant is in the autumn, although it may be sown at any time, but if sown in late August or September a slight covering of hay will insure its safety for the winter, and it is ready for spring duty at the first possible moment. Sow in light, rich soil.

Cress.—Sow in a damp, moist spot, or give plenty of water. Sow in drills or in side margin of cold-frame. Sow every two weeks for succession; cut often.

Cucumber.—Culture very like that of melons. Sow seed in a hotbed if desired for other use than pickles. Inverted sods are excellent. Plant out in good, rich soil when danger from frost is over—about

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May 20 (latitude New York) or else give protection with portable frames or bell glass; the latter method is preferable. Cucumbers should be in hills, 4 feet apart each way. Cucumbers like plenty of water. They should not be sown outside until the weather is settled unless portable frames are at hand for protection. They may be sown frequently for succession and, for pickles, sown until the end of August. One packet Cool and Crisp. Five hills are enough, 10 or 12 seeds to a hill.

Eggplant.—It is hard to understand why the eggplant is so frequently included in children's school gardens; it is not easy to grow; it requires the kind nursery of a hotbed; it demands careful and intelligent cooking or it is extremely indigestible and, although delicious when cooked properly, its food value is slight.

Not only must eggplant be started in a hotbed in February or early March, in order that the plants may have a season sufficiently long to mature, but its infancy is precarious; the young seedlings have to go through as many perils as a heroine of melodrama. Treat the seedlings the same as melon-seedlings; sow in the hotbed in tiny paper pots so that transplanting may be accomplished without a shock, and watch for insects. The flea-beetle and the potato-bug are their chief enemies, also they are very subject to a blight. The young foliage

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must be well dusted with land-plaster or with ashes to deter the flea-beetle, and the plants must be well sprayed with Bordeaux. Each plant will mature about four of the large, handsome purple seed-pods, so that a number of plants are needed if you wish to grow eggplant in any quantity. It is very decorative; there is a Chinese ornamental variety with small fruit as scarlet as holly-berries and marked like a tiny pumpkin; a white variety (edible) has very lovely violet blossoms. The plants need as much room as tomatoes—3 feet apart each way; they should have rich soil and plenty of moisture. Black Beauty is a good sort. Ten plants are enough; one packet if you grow from seed.

Endive.—Plant in light, rich soil, at end of June or first of July for fall and winter use. Rows 2 feet apart. Thin to stand 10 to 12 inches apart. When well grown tie the outer leaves together at the top for blanching. Take up plants when dry for winter storage. Endive exacts more space than other salad plants, but is very decorative in the garden. French Moss-Curled, Green Curled, and White Curled are all good sorts. One packet is enough.

HERBS

Catnip.—No suburban or country gardener needs grow this; it is a common wayside weed. If the city gardener with a beloved tabby cares for it, a few plants will give catnip enough for years.

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Lavender.—A perennial propagated by division of roots. A few roots will give enough. Every old-time garden had it for the perfume of the blossoms.

Marjoram.—Grows from seed sown in early spring or late summer. A perennial which needs winter protection.

Peppermint.—Grows from division of the stems.

Sage.—A perennial grown easily from seed. Sow in spring in the herb-bed; it is pretty enough to be in the flower-border. Give protection in winter.

Spearmint.—Every garden should have a little for the sake of mint sauce and mint jelly. It is propagated by dividing the creeping root, which is set out early in the spring. Likes a cool soil and once established the usual method of culture is simply to pull out superfluous plants.

Summer Savory.—An annual. Sow early in spring, like parsley.

Sweet Basil.—Grown from seed sown in early spring like any other annual.

Taragon.—Needs slight protection in winter. It is a perennial.

Thyme.—Pretty as an edging to a flower-border, as well as in the herb-bed. Sow in early spring.

Winter Savory.—Perennial, sow in early spring or late summer. Give winter protection.

Sow the herbs in good rich soil in small quantities and narrow rows. They will always take care of themselves. Before frost, cut the leaves, tie in bunches, and hang to dry in a warm place. As soon as thoroughly dry crumble the leaves and store in a tight receptacle.

Kale.—Another extremely decorative vegetable; it makes an unusually pretty border to a garden-

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bed. Kale is a very heavy feeder and requires a rich, heavy soil. The perennial kale—sea-kale—should be sown in the seed-bed in April, $\frac{1}{2}$ inch deep in rows a foot apart. Transplant later to stand 18 inches apart. Sea-kale can be used like asparagus by banking the plants with earth in the earliest spring and cutting the young shoots as asparagus is cut. Siberian kale may be sown in September, transplanted to stand a foot or 18 inches apart, given a slight covering in the winter, and it is ready to be cut for earliest of “greens” in the spring. The leaves may be picked as desired, or the whole plant used at once. Young leaves of kale make an admirable garnish. Its kinship to the cabbage is shown by the cabbage-worm which has something the same passion for it, and is met in the same manner with Paris green or Bordeaux. Two packets of seed are sufficient for a 50-foot row.

Kohlrabi.—Grown very much like cabbage. It requires a rich soil and plenty of room. Sow the seed in the hotbed or cold-frame in March, transplanting to the open ground as soon as the plants are well formed—usually in early June. Three feet apart each way is none too much room. The root-knob which rests on the surface of the soil is “it”—be careful not to cover this in cultivating. One packet Early Vienna.

Leeks.—Not difficult to grow, but require some “handling” in order that the stems be properly

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blanched. Sow early in the spring, seeds $\frac{1}{2}$ -inch deep, rows 8 to 10 inches apart. When 4 or 5 inches tall, thin; when 6 or 8 inches high, transplant, making a trench 8 to 10 inches deep, put a little manure in the bottom and cover with soil, set the roots deeply and fill in the trench gradually, just as if you were blanching celery. Interesting in the amateur garden for the silvery green foliage.

Lettuce.—Prefers a rich but rather light soil and plenty of moisture. The canny gardener may have lettuce if he chooses from March until Christmas-time. It is well to have several varieties, otherwise one's family is likely to weary of the same sort. The Cos or Romaine sorts are better for planting in hot weather. The culture is simple—the seeds may be sown in February in hotbed or cold-frame, and in the open. Sow in shallow rows at the earliest planting-time, and from then sow every two weeks for a succession until September, then sow in frames for winter use. If the lettuce is not of the heading sort, sow thickly, thinning as soon as three or four leaves have formed to stand 3 inches apart, thinning again as soon as the plants begin to crowd. The thinnings may be used on the table; this is the simplest method. Or, if economy in seed is necessary, lettuce may be sown in flats or in tiny receptacles—egg-shells or paper boxes, and transplanted at the first transplanting stage—when two or three true leaves have formed. Lettuce needs plenty of

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moisture and prefers cool weather. For this reason summer-sown lettuce is often sown in frames which have a lath shutter that may be drawn over during the heat of the day, or it is sown in partial shade.

There are dozens of varieties, but lettuce is of two types—the sort that heads and the sort that doesn't. The non-heading or "leaf" varieties are known as the Cos lettuce or Romaine; these are better for hot-weather planting. Black-Seeded Simpson is an old variety but excellent for early sowing; Trianon is a good Cos sort. The leaves of this may be blanched by banking, or by tying the outside leaves together, as endive is blanched, and cauliflower. Of the head-lettuce, Big Boston and Boston Market are standard varieties, May King and Summer Cabbage are good also. It is well to have a variety of kinds, lest one's family weary of one sort, and lettuce is too convenient a salad stand-by to be missing at any time. Get one or two packets each of several kinds and make small, frequent sowings.

Marjoram. (See *Herbs.*)

Muskmelons, Cantaloupe.—If possible, melons should be started in hotbeds or cold-frames, sowing the seeds on inverted sods, in flats, or in paper pots; they are sensitive to transplanting. Transplanting to the open should be done when the ground has become dry and warm. The soil for melons should

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be a light, rich, sandy soil, well-drained; they should be well supplied either with well-rotted manure or with a complete commercial fertilizer.

Melons must not be sown in the open until the weather is settled and frost danger past; then plant them, the hills 4 feet apart, 8 or 10 seeds to a hill. Watch closely for insects; dust the young leaves when wet with lime or ashes, or even road dust to discourage insect visitors, and do not thin the hills until the insect peril is past; after that, thin, leaving but three vines to a hill. Place a board under the melon, so that it may ripen off the ground. The best varieties of melons are Rocky Ford, Netted Gem, Emerald Gem. One packet each is enough.

The gardener will be wise in planting melons to use the barrel method. For this a half-barrel is sunk in the ground, all but six inches. Holes are bored, four, in each barrel-stave. Fill the barrel with manure and fertilizer and bank around it well-enriched soil. In this bank plant the melon seed. Fill the barrel with water. This brings liquid manure directly under the seeds. If you are planting but three or four hills of melons, it is worth while to try the barrel method.

Watermelons.—The culture of watermelons is the same as of muskmelons, except that they require more room and should be planted with the hills 8 or 10 feet apart.

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Okra should be in a garden for its beauty if for no other reason. A plant of easy culture; sow seeds in May when the ground is warm and transplant or thin to stand 1 foot apart.

Onions may be sown at the earliest possible moment in spring; even if freezing weather comes later it will not injure them. Rich, sandy soil is their preferred diet. Plant in rows a foot apart. It is not necessary to sow thickly for very few seeds fail to mature. When the young plants are up, thin any clusters so that each plant stands alone; when 4 or 5 inches high, thin again to stand 4 to 6 inches apart. Keep the soil light and loose by cultivation. When onions are ripe the top dies; the bulbs should then be pulled and left exposed in a dry place. Prizetaker, a fine, large onion, is popular, also Yellow Danvers. One ounce sows 150 feet. The large Bermuda onions are of easy culture, but the seed must be started in the hotbed in February or March, and the seedlings transplanted later to the open ground; also, they are not so easily kept in winter.

Onion-Sets.—A most convenient crop for the amateur gardener. These are simply young onions from fall-sown seed which may be planted out very early. Onion-sets may be bought by the quart until about May 1st. One quart of sets to 100 feet is the allowance. Make successional plantings every two weeks

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and use as green onions. The onion-sets may be tucked in wherever there is room—they mature very quickly and are out of the way before the rightful owner of the row is ready for the space, and may be planted very closely, only a few inches apart. Onions for sets should be sown in the autumn and the bed covered for the winter with leaves held in place by branches.

Parsley.—One of the easiest of vegetables to grow. Every garden should have a little. Sow as soon as the ground can be worked, in rows 1 foot apart. Radish may be sown in the same row—it is up before the parsley needs the space. Grow it also in a pot or cold-frame for winter use. One packet Triple-Curled.

Parsnip.—A vegetable root-crop of very easy culture, but an all-season grower. The seed should be sown as early as possible; it is slow in germinating. The soil should be deep and rich, the rows 12 to 18 inches apart, and the parsnips thinned to 6 inches apart in the rows. Parsnip and radish are usually sown together in the very early spring, the former marking the rows and ready to be pulled and eaten before the latter need the space. Roots may be left in the ground since freezing does not injure them. Parsnips are singularly unworried by insects. Hollow Crown is a good sort. One-half ounce sows 100 feet.

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Peas.—Every gardener who can by any possibility give the space likes to grow his own peas. In culture they are not unlike the sweet peas, and are among the very earliest of the plantings. The wrinkled varieties are usually sweeter and of better flavor, but cannot stand so severe cold as the smooth-shelled; therefore first plantings are always of the smooth-shelled sorts. Among the excellent early varieties are Nott's Excelsior, Alaska, Daniel O'Rourke, but there are many excellent early sorts and if you have a preferred seedsman by all means try his "earliest." Peas thrive in light, dry soil, which need not be very rich. Sow the earliest varieties in double rows 6 inches apart; these double rows should be 3 feet apart. Seed should be 3 inches deep, about an inch apart in the row. The brush or whatever support is used should be set early. Keep the ground free from weeds and fine. Peas may be sown every two weeks for a succession until July. Daniel O'Rourke will produce a crop in the latitude of New York if sown from the seed to the last week in August. Little Marvel is excellent for sowing for succession during the summer.

The chief enemy is the cutworm, which attacks the young vines in late May and early June and is best met by poisoned bait (p. 137). Make seven or eight sowings at two-week intervals, sowing a 40

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or 50-foot row at each sowing. One quart sows 150 feet.

Peppermint. (See *Herbs*.)

Peppers.—The chief difficulty in growing peppers is to get them started sufficiently early; they have few insect enemies and are rarely troubled by disease, and for these reasons should be a most attractive crop for the amateur—and they are very decorative besides. They are tropical plants and are not always able to complete their growth in the brief northern summer. This difficulty is met in two ways. The simplest, is to do as most amateurs do in the matter of tomatoes: buy the plants ready to set out and let some one else have the trouble of nursing the young things through their infancy. The other method is to start them early in boxes in the house or in a hotbed (a cold-frame does not give sufficient warmth for these). They should be started the end of February or in early March. The market-gardeners sow them first in "flats," then transplant the seedlings to 2½-inch pots, later to 4-inch pots, and then "harden them off" by a few weeks in the cold-frame, the pots plunged in the soil up to the rim. The peppers should be started a week earlier than tomatoes; aside from this, their culture is the same. Try six plants Chinese Giant.

Pe-tsai (Chinese Cabbage).—Sow in April or early May; transplant to rows 1½ feet apart,

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plants 12 inches apart in the row. Use as lettuce is used.

Potatoes.—A loose, rich soil, sandy rather than clayey is liked by potatoes. They even do well on a gravelly or rocky loam, provided it is rich and is loose and well-drained. They like a rich soil, and yet direct contact with manure is likely to cause scab. In fact, the grower of potatoes must possess his soul in patience, and do much of his soil preparation the year before, give a heavy dressing of manure or sow and plough in a crop of cow-peas or crimson clover. If the potato-eyes are planted 4 inches deep the necessity for hilling is done away with, and the potatoes may be cultivated as any other vegetable is cultivated and without the tedious practice of hilling with a hoe. The seed-potatoes are cut so that each piece has at least two "eyes." Potatoes are planted from a foot to 18 inches apart in the row, and the rows 2 feet to 3 feet apart—depending chiefly on whether you intend to cultivate by hand or to avail yourself of the services of a horse. Eight to ten bushels to the acre are used in sowing. One piece to a hill.

Most important in potato-growing is spraying. The potato is as certain to be attacked by the potato-bug as our Puritan ancestors were to be assailed by the devil, and the only safety is in preparedness. As soon as the young plants are 5 or

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6 inches high spray with Bordeaux mixture. Some growers spray as soon as the plants appear. Add Paris green or arsenate of lead to the Bordeaux and four distinct enemies are met and vanquished, the early and late blight, the flea-beetle, and the Colorado or potato beetle. Spray both the upper and under surfaces of the leaves. Among the best varieties of potatoes are Green Mountain, Irish Cobbler, Triumph, Early Rose, Rural New Yorker.

Potato-Pens.—This is the newest thing in potato-growing, and adapts the art to the small back-yard or the smallest suburban place. The theory is based on the fact that potatoes are tubers and ripen in the ground, that their tops are vines and, therefore, can as easily grow laterally as vertically. The potato-pen is in form a layer-cake. The typical "pen" is 6 feet 6 inches by 6 feet. It is 5 or 6 feet high. The sides are of boards set some 3 or 4 inches apart, like the boards of a fence. Stout 2 x 4 posts at the corners support the structure.

First comes a layer of manure, well-rotted, then a 6-inch layer of soil. In this the potato seed is planted, pieces with at least two eyes, at a distance of a foot each way. The eye should be pointing outward or toward the nearest light. These are covered just as are field-grown potatoes; next come 3 or 4 inches of straw; then manure, and then soil, and another planting of the seed potatoes; these

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are covered, again the intervening straw, then manure and another layer of potatoes. When the top of the pen is reached the surface is hollowed slightly, to retain the moisture, instead of being rounded-up to shed it. The potato-vines cover the top and sides in one magnificent tangle so that the whole looks like a mound of green. From time to time a stick is thrust into the intervening straw to give the vines a better chance to crawl out into the light. One grower asserts that he harvested 42 bushels from such a potato-pen. The spraying is the same as for potatoes grown in the old-fashioned way. When harvest-time comes, the pen is taken down, the vines pulled out and the crop tumbles out almost unaided.

Pumpkin.—Culture same as for squash, but the hills must be at least 6 feet apart. The pumpkin is less liable to insect attacks. Usually planted among the corn. Winter Luxury is a good sort. One packet of seeds and a sowing of 5 hills quite enough for a small place.

Radish.—Sow in the hotbed or cold-frame for early use, and in the open ground as soon as planting is possible. It may be sown every two weeks for a succession, but does not do well in hot weather. Radishes need a light, loose soil, and are often used to mark the rows for parsnip or for some other slow-germinating crop. Pull and use when quite small.

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Cover the seed $\frac{1}{2}$ inch deep, have the rows 1 foot apart (6 inches in the hotbed) and thin to stand 6 to 8 inches apart. Winter radishes may be sown in autumn. One-half ounce sows 50 feet. Make small, frequent sowings.

Rhubarb.—It is far simpler to buy the roots—three or four are ample for a small garden. Once established, rhubarb needs very little care. It should have a very rich soil, and in winter will benefit much from a heavy mulching with manure. Set the plants 4 feet apart. Rhubarb is very decorative—quite as effective as *Caladium*.

Sage. (See *Herbs*.)

Salsify, Oyster-Plant.—An all-season crop like parsnip, and its culture is the same. Salsify may be left in the ground until spring. Mammoth Sandwich Island is a good sort. One-half ounce of seed for 50 feet.

Spearmint. (See *Herbs*.)

Spinach.—Sow in earliest spring; seed should be 1 inch deep; sow thickly and use thinnings for greens. Sow Victoria in light, rich soil every two weeks for a succession during April and May. For summer use sow New Zealand spinach, in hills 2 feet apart each way, 3 or 4 seeds to a hill. In August and September sow prickly or winter spinach for fall use. If given slight protection the outdoor crop will yield until Christmas. Spinach likes mois-

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ture. If you have nothing in the cold-frames in autumn, sow spinach broadcast in them. One-half ounce each of Victoria and New Zealand enough for 200 feet.

Squash.—Needs rich soil, the richer the better. Squashes grown where a compost-heap has been will often attain a prodigious size. The culture is the same as for melons, the hills being 4 feet apart, but they should not be near melons or the flavor of the latter will suffer.

Squash-vines are frequently attacked by the squash-borer and the squash-bug. It is well, therefore, to make several successive plantings of squash so that if the first crop is destroyed the second will be safe; also sow 8 or 10 seeds to the hill. The seedlings must be thinned later to 4 or 5, but such thinning is not done until the peril from the squash-borer is passed, which frequently performs the thinning for the gardener. There are many good varieties—Crookneck, Delicate, Early Golden Custard for the summer, and a few winter ones of the Hubbard varieties. One packet each of the preferred varieties.

Winter squashes have a high food value and should be grown far more than at present. Squash should be stored in a dry, warm place and will keep well if the temperature is not above 45° Fahr.

Summer Savory. (See *Herbs.*)

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Sweet Basil. (See *Herbs.*)

Sweet Potato.—Let the seed-potato sprout under glass and transplant the sprouts, setting them 3 inches deep in rows 2 feet apart, the plants being 1½ feet apart.

Swiss Chard.—An excellent summer green, very easy of cultivation. Culture the same as for spinach; sow early in rows a foot apart and thin for use. Swiss Chard may be sown at intervals in summer wherever there is space for it. Swiss Chard is a seed which has devoted its entire attention to foliage.

Tarragon. (See *Herbs.*)

Thyme. (See *Herbs.*)

Tomato.—The easiest way of growing tomatoes is to buy the plants and set them out in the open ground before frost comes. The plants should be 3 feet apart each way, and the young seedlings plunged in the ground 5 inches deeper than they were previous to transplanting. Tomatoes should have a warm situation and good soil. It is possible to have a second crop, following perhaps early in the autumn, if the soil should be manured and well watered over. Have the holes ready before taking out the young seedlings. Bone-meal and wood-ashes are much liked by tomatoes and a little in the bottom of each hole contributes markedly to their welfare. If transplanting in dry weather, fill the hole with water before setting in the young plant. Slip it in care-

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fully, fill in with soil and press down firmly. Protect from sun and heat for a few days. A variety of supports may be given tomatoes, but support



A pot-grown tomato-plant ready for setting out

of some sort they must have. They may be trained against a picket fence as if the tomato-vine were a crimson Rambler—and indeed it might be so named—a wire trellis such as peas are grown on, or they may be trained to a single stake. Give nitrate of soda or liquid manure during

the growing season and plenty of water. Watch for the tomato-worm, a portly green caterpillar described elsewhere, and destroy him.

If the tomatoes are grown from seed, it should be sown indoors or in the frames in March (latitude of New York). Sow in flats in paper pots, or bottomless cans or any convenient receptacle. If sown in a box or flat, drainage should be provided—holes punched—then a layer of gravel or charcoal,

PLANTING AND CULTURAL DIRECTIONS

next a mixture one part well-rotted manure, one part sand, one part leaf-mould. Sow in rows 3 or 4 inches apart. Strew lightly with fine soil, press down firmly with a board, and sprinkle with a fine spray. When 2 or 3 true leaves have appeared the plants may be thinned or transplanted into other pots or boxes. Among many good varieties are Earliana, Globe, and Livingston's. Red Rock is an excellent tomato for the home garden. One packet each is enough, for 1 ounce gives 2,000 plants.

Turnips have two sowings, the first as early as the gardening begins, the second, of turnips for winter use, in July or August. For early turnips, sow in rows 18 inches apart, thinning the seedlings to stand 6 inches apart. Good soil and good tillage are important. For the fall crop, which is used for winter storage, the seed is broadcasted wherever there is space for it. The best varieties for spring sowing are Milan Early Purple, and Milan Early White. One packet each is enough.

The Rutabaga or Swedish Turnip has a higher food value. Its culture is the same as that of the common turnip, except that it is slower maturing, and therefore must be sown not later than June.

XIV

THE MEDICINE-CHEST

In dealing with insects and other garden enemies preparedness is the key-note of success. If one can be just a little before these workers of iniquity, it is worth any amount of effort afterward; the situation is saved, the citadel untaken; while afterward, although one may drive out the enemy, he may have left the territory ruined.



Tomato-worm, exact color of
the plant

If the habit is formed of looking closely and carefully at the plants when picking or of stopping occasionally, when cultivating, and turning back the potato-foliage to look for the clusters of tiny orange eggs, which indicate to the learned

that the potato-bug has announced his intention of a visit, the labor of dealing with insect pests is greatly reduced. It is a simple matter, in the case of the potato-beetle, to pinch off the few leaves that you notice bearing the orange danger-signal and to

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crush them between the fingers or drop them into a pan of kerosene-oil. The tomato-worm, a huge, thick fellow, almost as large as one's finger, is exactly the color of the stem. Rarely do you find more than one to a plant. And if that one is caught and dealt with, your troubles with the tomato-worm may be over for the season. Watch the cabbage-plants also for the first signs of the cabbage-worm—the small hole bored in the leaf. A few doses of slug-shot will send off the enemy, but if you wait until he has penetrated to the heart of your cabbages, he will inflict heavy losses. As the old garden rhyme has it,

Why wait for the insects till plenty come?

Kill the first—and the second brood stays at home.

If the runners of your young squash-vines turn suddenly limp, slit the stem and look for the squash-borer and kill him.

It is because of the fate that may lie in store for the earliest crops that the planting of successive sowings are of peculiar value to the beginning gardener. He may lose his first hills of squash, but if he succeeds in killing the enemy, the next to come will be safe.

Poor and diseased soil is an invitation to club-root in cabbage and cauliflower, and to scab in potatoes, and if you have any doubt of your soil it is best to treat it to bone-meal and wood-ashes,

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to plough and plant crimson clover or cow-peas or some other soil restorative. Plough in this crop before planting again the crops that have suffered; good soil and crops properly rotated do not produce such difficulties.

TONICS

Very often a crop, while still unworried by insects or actual disease, is undernourished, in which case a tonic is highly beneficial.

Nitrate of Soda.—A valuable tonic, especially for the newly transplanted. In setting out tomato-vines work in about a tablespoonful about each plant. Do not let it come in direct contact with the plant. A tablespoonful to a plant is enough.

Well-Rotted Manure.—The best of soil-tonics since it improves the texture of the soil as well as enriching. It is slow in action, must be applied in spring or fall at time of ploughing, or lie on the ground all winter to be ploughed in in spring.

Liquid Manure is a tonic much relished by these vines and may be administered in the same way. It is especially valuable for the use of the belated garden or of one whose soil was not properly enriched and whose plants are now suffering from the lack of nourishment. It is made in this fashion:

Take a gunny sack and fill it half full with old, well-rotted manure. Place the sack, tied securely,

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in a barrel or cask and fill the latter with water. Cover and let stand for several days, then give it to the plants either with the can just referred to, or by "trench-watering"—that is, dig a furrow with the hoe between the rows, pour into it the liquid manure from a watering-can with the nozzle removed, and when the liquid has settled, replace the soil and make it even again. Either of these methods gives the nourishment where the plant-roots can get it without coming to the surface.

Bone-Meal (Ground).—A tonic every garden should have. If the soil has not been properly enriched, use a trowelful at the bottom of each hole in transplanting and the same of wood-ashes. Bone-meal and wood-ashes are strewn broadcast before digging or ploughing.

Wood-Ashes.—Bone-meal and wood-ashes with the addition of a little nitrate of soda make a fairly complete fertilizer. Use a trowelful of wood-ashes in the bottom of the hole in transplanting.

Chicken Manure.—A highly valuable fertilizer. Use in small quantities near the plants—a trowelful dug in—or put in the compost-heap.

REMEDIES

Forehanded gardeners have their arsenal stocked and do not have to let the intruders eat up their plants while they are searching for the proper

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remedy in garden books, or, having found it, are waiting for the stuff to arrive. There are standard remedies which thrifty gardeners have ready at hand.

In the small garden it is much more convenient to buy the commercial insecticide or fungicide. One uses them in small quantities, and while perfectly possible and practical to make up the formulæ, they are what housewives call "messy"; also most of them are deadly poisons and extremely unsafe to have around.

The following are excellent remedies which every gardener should have at hand:

Bordeaux mixture in the garden is as castor-oil in the nursery. In "muggy" weather spraying with Bordeaux will prevent blight and mildew. Spray the potato-plants before the vines are one-third grown; in two weeks repeat the dose, and the tubers below the surface will thank you. (Amateur gardeners sometimes forget how close and intimate is the relation between the foliage of a root-crop and the vegetable itself. Healthy foliage means a well-developed root and diseased or insect-worried foliage a crop of little value.) Get the Bordeaux in pulp form and dilute—one part to twenty-five or fifty parts of water, or else use the formula:

Bordeaux Mixture.—2 pounds copper sulphate; 2 pounds fresh lime; 25 gallons water.

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Dissolve the copper sulphate in $12\frac{1}{2}$ gallons of water. Slake the lime and dilute in $12\frac{1}{2}$ gallons water. Pour together into a wooden or earthenware vessel. Bordeaux may be bought "ready-made" in small quantities, which is the most convenient way for the amateur gardener. Useful for asparagus-rust, blight on beans, mildew on cucumber and onion, late blight on potato, leaf-spot on tomato, wilt on squash, anthracnose on currant and grape, mildew and black rot on grapes, leaf-blight on strawberries, bitter-rot on apple, leaf-curl on peach, leaf and fruit spot on quince, flea-beetle on tomato.

Paris green should be ready for the potato-bugs before these worthies make their appearance. There are two ways of applying this: as a powder, mixed with about 80 to 100 parts of plaster; dust the vines with this when moist from the dew, or else mix the Paris green with water (1 tablespoonful to a pail) and apply with a small brush; stir well or the Paris green will settle. Here is the formula:

Paris Green.— $\frac{1}{2}$ pound; $1\frac{1}{2}$ pounds lime; 50 gallons water. This is enough for several acres.

The lime is to prevent burning of foliage. Paris green may be used dry, mixed with flour or land-plaster. It may also be added to Bordeaux mixture or lime-sulphur solution. It is used for cabbage-worm, cucumber-beetle, and potato-bug.

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At the first sign of a striped coat of the potato-beetle apply this poison. Paris green is an effective weapon against all chewing insects.

Tobacco dust is another handy remedy. It should be dusted over the young cabbage-plants to keep off the turnip-flea.

Saltpetre for the cabbage-worm. Use 1 ounce dissolved in 12 quarts of water, and sprinkle the plants thoroughly.

Kerosene Emulsion.— $\frac{1}{2}$ pound hard soap; 1 gallon hot water; 2 gallons kerosene.

Dissolve the soap in the hot water, add the kerosene, churning violently the while. When applied add 8 to 15 parts of water to the emulsion. Kerosene emulsion is a safe insecticide to have on hand; it is useful for all kinds of plant-lice and aphides—the tiny, stem-swarmering villains, for the tiny spider, the bean-beetle, the four-lined plant-bug a small reddish or yellow-and-black bug that in the spring worries the currant-bushes. Kerosene emulsion is best applied with a spray. Be sure to get it on the under-side of the leaves.

Hellebore.—Apply dry with bellows or “duster,” or mix with water, 1 ounce to 2 gallons. Used for currant-worm and cabbage-worm, when discovered near fruiting-time.

Arsenate of Lead.—25 gallons water; $\frac{3}{4}$ pound arsenate of lead (powder); $31\frac{1}{2}$ pounds paste.

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Used for codling-moth, a whitish caterpillar that infests apple-trees, elm-beetle, gypsy-moth, flea-beetle on sweet potatoes.

Lime-Sulphur (the Commercial).—The winter spray used on all fruit-trees before growth begins. It serves also in summer for leaf-spot on cherry-trees, brown-spot on plum, for peach twig-borer and peach leaf-curl, for brown-rot on peaches and the pear-psylla, or jumping louse, which in spring and summer makes the leaves black and sticky. Lime-sulphur is the remedy to apply beforehand to San José scale.

Poisoned Bran Mash.—1 pound Paris green, powdered lead arsenate, or white arsenic; 25 pounds bran; 2 quarts molasses or cheap syrup; water, if needed, to make a stiff paste.

Mix the powdered poison and the bran thoroughly before adding the syrup. Used as bait for cutworms.

Formalin is used for treating seed-potatoes to prevent scab. $\frac{1}{2}$ pound to 15 gallons water. Seed is soaked in this two hours before planting. Formalin in solution can be bought in smaller quantities more conveniently.

Most seed houses, for the convenience of the amateur gardener, have ready-to-put-on insecticides and fungicides which can be bought in small quantities and are very convenient to apply. Slug-shot

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is an exceedingly good all-round remedy. It can be applied either by dusting on the leaves as a powder or by spraying, but do not, in an excess of enthusiasm, use too much of any of these insect remedies. A proper dilution thoroughly applied is far better than an overstrong solution.

WAYS OF APPLYING REMEDIES

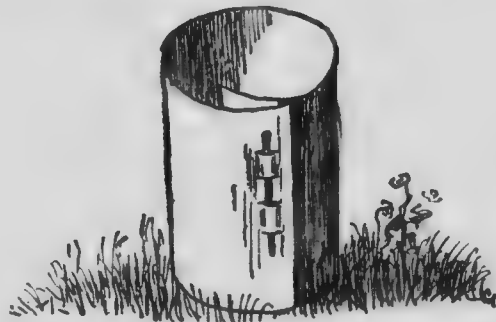
Kerosene emulsion, lime-sulphur wash, and Bordeaux mixture are applied with a sprayer; this, for small plants, may be a hand-syringe. The size of sprayers varies from a small, inexpensive hand-affair, to a large machine such as are used by orchardists. For the home garden the knapsack sprayer is very convenient; pressure enough is given to send the spray into the tops of small fruit-trees, and the small boy who flies from the lawn-mower will work the sprayer with joy. Care must be exercised to reach the under-side of the leaves, and in spraying a tree stand on the windward side. Stand close to the trunk of the tree and spray upward and outward. Don't spray fruit-trees during blossoming. Spray before the buds have opened and after the petals have fallen.

Powdered hellebore, Paris green, or slug-shot are applied with a duster or a bellows. With a duster in each hand one can go quickly down the rows of potatoes dusting two rows at once.

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If you have no spraying outfit use a pail and a small whisk-broom and stir the mixture often.

There is a tidy little income for some one who will familiarize himself or herself with the various



The paper collar used as protection from cutworms

insecticides, and in the early spring take orders to give the little gardens their spring medicine. The work would require two visits, one of survey to note what spray was needed, the second, to apply it. Thus all the gardens in town that needed a lime-sulphur wash would have it at the proper time at a slight cost, and Bordeaux also would be given to a dozen gardens in a day instead of to one.

If the gardener keeps up his watchfulness in late June and early July, his plants will have weathered the difficult stage in their career—the time which is to plants as the second summer to a baby.

Cutworms may be poisoned by prepared bait

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spread near the plants at night. When weeding or transplanting always keep on the lookout for these sinners; they will be found about a half-inch below the surface. As a defense plants are set out in paper collars, unsoldered and bottomless tin cans. It is cheering to the gardener to remember that cutworms are very local; they may completely destroy plants on one side of a path, while on the other the bed is clear. Just here the practice of planting by small successive sowings is of peculiar value to the first-year gardener, for if one sowing is taken by the enemy, all is not lost; in two weeks another crop will be along, and by that time he will have his defense ready, or the enemy itself may have gone off to worry another garden.

Plants that are thrifty, well cultivated, free from weeds, are far less likely to be troubled by plant diseases. And, although the list of plant diseases and afflictions seems portentous, the average gardener need expect but slight difficulty; the list of children's diseases is terrifying, but the average youngster is a healthy specimen, and, given ordinarily good care, remains so.

PLANT AFFLICTIONS AND THE SYMPTOMS

The common diseases to which each of the various crops is especially liable are here given, the symptoms and indicated remedies. The wise gardener is

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able to detect the danger-signals and administer remedies before the case becomes serious.

ASPARAGUS

Rust.—Symptoms: Reddish or black pustules on stem or branches; appears in summer and autumn. Spray with Bordeaux 5-5-50* once or twice a week all season.

Asparagus-Beetle and Its Grub.—Symptoms: Shoots eaten in spring and summer. Dose young plants with arsenate of lead.

BEAN

Bean-Beetle.—Symptoms: Leaves eaten by a grub that appears in summer. Treatment: Arsenate of lead or kerosene emulsion; 1 part emulsion to 8 parts water.

Anthracnose.—Symptoms: Leaves and pods spotted. Disease appears in the summer. Treatment: Bordeaux; spray when plants first appear, when first leaves have formed, and when pods have set.

Rust.—Symptoms: Rusty spots on leaves appearing in summer and autumn. Best treatment is preventive. Plant varieties that are resistant; burn old vines each year.

Root and Stem Rot.—Symptoms: On pods and at the base of stem a white, mouldy growth is found. This indicates a poor condition of the soil, which needs drainage and liming.

* 5 lbs. copper sulphate, 5 lbs. fresh lime, 50 gals. water.

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BEET

Leaf-Spot.—Symptoms: In summer or autumn circular spots, gray centre with a black border, appear on leaves. Treatment: Bordeaux; spray every ten days. Spray first when four or five leaves have appeared, afterward three additional sprayings at ten-day intervals.

Root-Rot.—Symptoms: Root rotted and cracked at crown, base of leaves black. Disease is a symptom of poor soil condition, lack of drainage, and lack of lime in soil.

Scab.—Another root-disease indicating poor soil conditions, shown by warty and scabby spots on the beet-roots. Treatment: Plant beets in another place, give fertilizer and lime, and grow a legume in former place.

CABBAGE

Cabbage-Aphis.—Symptoms: Leaves thronged with tiny plant-lice in summer. Treatment: Spray with kerosene emulsion; repeat if necessary.

Cabbage-Worm.—Symptoms: Holes eaten in leaves; appear usually in early summer; worm is a green caterpillar. Use Paris green before leaves have headed, or slug-shot. After leaves have headed use hellebore.

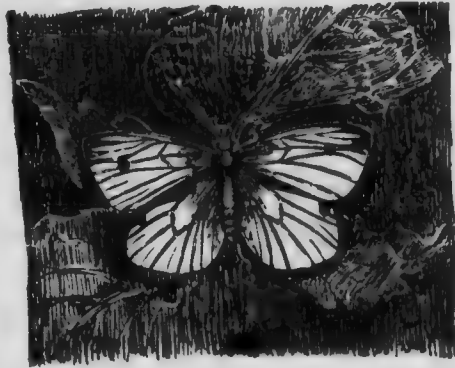
Cutworms.—Symptoms: Stems bitten wholly or partly through on young plants. Treatment: Band stems with paper and use poisoned bait.

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Harlequin Cabbage-Bug. — Symptoms: Wilting leaves as if the plant were suffering from drought; enemy is a small red-and-black bug. Treatment: Hand-picking or setting out decoy plants of mustard early and killing the bugs on these with kerosene.

Black Rot.—Symptoms: Irregular black spots on the leaves appear in summer; leaves yellow, then black on margin, then fall.

Treatment: Grow in clean soil; this is a disease of poor conditions; practise crop rotation; treat seed in mercuric bichloride 1-1,000 for a quarter-hour.



The cabbage-butterfly, parent of the cabbage-worm

CAULIFLOWER

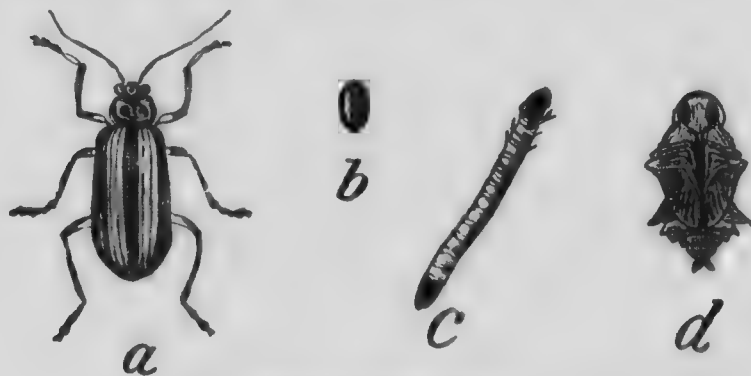
Black Rot.—Symptoms and treatment identical with black rot in cabbage.

Club-Root. — A soil-disorder. Symptoms: Deformed roots, plants stunted, failure to head. Treatment is preventive only. Use other land; plant out only healthy seedlings; see that manure contains no cabbage refuse.

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CELERY

Early Blight.—Symptoms: Yellowing, spotted leaves; appears often in frames or seed-beds. Treatment: Spray with Bordeaux or with ammoniacal copper carbonate, spraying frequently to keep new



Striped cucumber-beetle

a, adult beetle; b, eggs; c, larva; d, pupa

growth covered. If possible destroy seedlings and plant others, planting in moist soil or in dry, shaded situations.

Celery-Blight or Late Blight.—Symptoms and treatment the same, but disease later in appearance; continue treatment until harvesting; see to it that the celery has good drainage.

CUCUMBER

Downy Mildew (Blight).—Symptoms: Mildewed, yellow leaves and vines drying. Appears about fruiting-time. Treatment: Spray with Bordeaux

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5-5-50, spraying every fortnight from the time the plants begin to run. Burn in autumn all diseased plants; don't put on the compost-heap.

Striped Cucumber-Beetle.—Symptoms: Gnawed leaves and wilting of plant, also appearance of black-and-yellow beetle in summer. Treatment: Bordeaux to which Paris green has been added; dust foliage with ashes or land-plaster.

ONION

Onion-Maggot.—Symptoms: Wilting tops; look for maggot at base of roots. Treatment: Carbolic-soap wash; also expose base of roots to sun for several hours.

Mildew.—Symptoms: Gray mildew on leaves, general wilting of plants. Treatment: Spray with Bordeaux, beginning when plants show three leaves, repeating every ten days; add sticker of resin-sal-soda soap to spray.

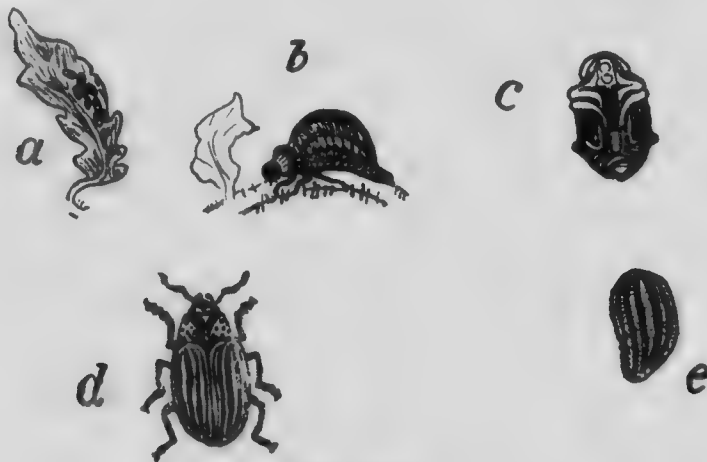
Smut.—Symptoms: Black pustules on leaves, also on bulbs. A soil-disorder; onions from sets planted in clean soil never suffer. Drill sulphur and lime into soil when planting seed.

POTATO

Scab.—A serious disease. For several years soil that has produced scabby tubers should not be used for potato-growing. Soak seed in formalin solution before planting.

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Late Blight.—Appears about blossoming-time. Symptoms: Leaves spotted and black; potatoes show dry rot. Treatment: Bordeaux. Begin when plants are 6 inches high; make six or seven applications.



Potato-bugs

a, eggs; b, larva; c, pupa; d, adult; e, wing cover of adult

Potato-Beetle.—Symptoms: Leaves eaten, tiny orange globules on under-side of leaves. Treatment: Paris green or arsenate of lead or hand-picking.

Stalk-Borer.—Symptoms: Wilting stalks and the presence of a brown caterpillar; destroy infested stems.

SQUASH

Squash-Borer.—Symptoms: Wilting runners. Slit stem, look for borer, and kill him. Treatment: Plant early trap vines and kill on these.

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Squash-Bug.—Symptoms: Wilting leaves and the presence of a small black bug. Treatment: The only remedy is personal work—hand-picking or trapping under shingles.



Squash-bug, a sucking insect
a, adult; b, egg cluster; c, d, e, young bugs in different stages

TOMATO

Cucumber or Flea Beetle.—Symptoms: Yellow-speckled leaves and presence of the small beetle. Treatment: Bordeaux poisoned with Paris green.

Tomato-Worm.—Symptoms: Leaves devoured. Worm is a large green caterpillar exactly the color of the tomato-stems. Treatment: Hand-picking; rarely more than one is found on a plant.

Leaf-Spot.—Symptoms: About mid-July tiny angular spots appear on leaves. Treatment: Spray

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with Bordeaux. Remedial measures: Stake and tie up plants; pinch off lower leaves when setting out.

TURNIP

Club-Root.—Symptoms: Plants stunted and unhealthy; roots deformed. A disease due to bad soil, like club-root of cabbage or celery. Liming of soil necessary and radical improvement of it.

XV

FIRST AIDS TO THE GARDENER. VARIOUS TOOLS AND GARDENING DEVICES

Few forms of garden gossip are more interesting than the comparison of notes by veterans in the matter of equipment. Every gardener has his preferred weapons. Each is quite sure that his are preferable, and has excellent reasons for his opinion.

In maintaining a beautiful balance in the vegetable-garden, for insuring that stately procession of crop after crop, proceeding uninterrupted, unbroken, from the first radish until the last spinach is brought in with the snow on its feathery green foliage, and then a cellar sufficiently well-stocked to hold out the entire winter—in the attainment of this ideal no device is of greater help than a garden engagement book—a sort of pre-diary, a book in diary form, but wisely written up beforehand, very likely on some winter evening or rainy day in February—a diary of things as they ought to be. It serves as an invaluable elbow-jogger; it is a life-line of a sort, which the gardener may grasp when in the rushing maelstrom of spring planting.

The trouble is that when reading garden books

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one may understand perfectly that trap-vines of squash should be planted early, that peas and beans and beets should be sown for a succession, but in the haste of planting, when the gardener has so very many things to remember at once, the matter of what quantity at what time is easily overlooked. Therefore, since the garden is already planned, take the "pre-diary," sit down, and stake out the planting under its appropriate date. Suppose the first planting of beans should be about May 15. Then under that date enter: "Beans—Plant 25 feet of —." Then, if you intend planting them every two weeks for a succession, put them down again under the dates of May 30, June 13, June 27, etc. The same way with other plantings. It is very little trouble and an immense saving of mental effort. It oils the wheels of the garden's progress amazingly. Madam Gardener will keep this garden engagement book on her desk. She will glance at it every morning. Suppose on the morning of June 3 she reads: "Plant a row of Golden Bantam." "But I planted corn last week," she says, and then looks back to verify her impression—no, it was not corn but peas that went in last week.

And so the corn goes in on schedule, and to the gardener goes all the credit of his beautiful succession.

It is also a valuable aid to the garden if one can

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enlist the interest of one's family, of visitors, or of friends.

An expert gardener and a friend of mine has an amusingly effective method of engaging the interest of a guest. She has fascinating implements. First she takes the friend out "to see the garden"; then (a natural thing surely in a veteran gardener) she begins some bit of garden work, perhaps poking about the base of young plants.

"What are you doing?" inquires the visitor.

"Looking for cutworms."

"And how do you look for them and where do you find them?"

My friend explains, and directly the visitor is interested and also wishes to join in the search, whereupon the newest type of kneeling-cushion is given to the novice. Presently my friend has urgent business calling her indoors; meanwhile the visitor has become interested and may work well for an hour or so.

Besides these moral and diplomatic aids, there are many mechanical ones. Most useful of implements is the hand-cultivator, of which the Planet Jr. is a good type. These little cultivators have a very arsenal of equipment—plough and cultivator, marker of furrow and harrow and are yet small enough to be lifted easily to dodge a young plant. To most gardeners there is nothing more fascinating

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than an implement catalogue. There are fetching little handcarts of really charming shape, but for a small garden a wheelbarrow is adequate for the work. For the feminine gardener, more convenient than the wheelbarrow is a four-wheeled child's express-wagon. This is very easily brought from one place to another, holds quite a heavy load, is very steady, and usually can be requisitioned.

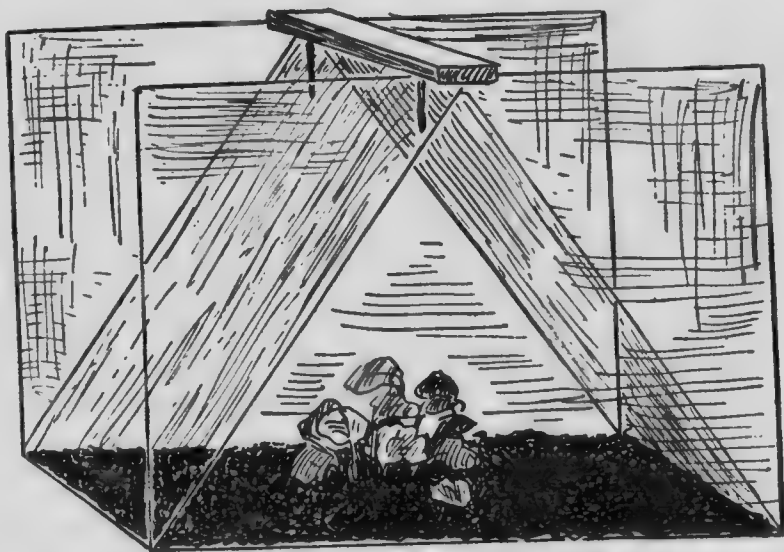
A four-tined earth-fork is indispensable. For digging it is a far easier implement than a spade. One will need also a 50-foot garden-line, a pointed weeding-hoe, an iron rake, trowel and spade and "dibble." This is used in transplanting and may be made of a broken spade-handle pointed at the end like a lead-pencil. A wheel-hoe makes cultivation a very easy matter.

These are the necessary implements. Among the many conveniences which are to the gardener as clever cooking equipment to the housekeeper is the portable frame, which may be cheaply bought or may be home-made; it is simply a box without top or bottom and in the top is fitted glass; this is set over seedlings wherever their protection is necessary.

There is the propagating-box, a very simple device, a square box and five lights of glass; the earth holds the glass in place; the fifth light is laid on top; it is a tiny greenhouse.

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Another home-made plant comfort is the screen against the marauding insects for melon-vines. This can be made of a barrel hoop with two arches of



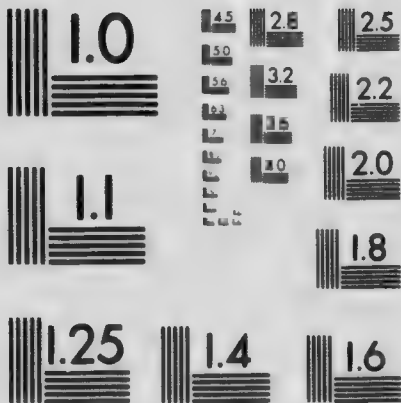
Panes of glass, used for a forcing hill

wire across it at right angles and over all netting which is tacked to the barrel-hoop frame. Set over a melon-vine, it keeps it safe.

Simpler than this is a screen made of wire arches like croquet-arches, thrust in the ground over the threatened plant; then a square of netting is thrown over and a halo of wire dropped over that, and pegged down with clothes-pins or with earth. This is the most quickly improvised screen I know.

The weeding-cushion is another excellent device,





MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS
STANDARD REFERENCE MATERIAL 1010a
(ANSI and ISO TEST CHART No. 2)

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though the comfort here is for the gardener. When lifted up, the cushion disposes itself like the old-time saddle-bags, one side holding weeding-tools; so when shifting his (or her) position the gardener is able, in one hand, to carry with him all his tools and cushion besides.

The sunken can is a homely device but very useful; it is a tin can having four or five holes punched in the bottom; this can is sunk between such heavy drinkers as tomato-vines and filled several times with water, which, being given below the surface, not on it, reaches the roots directly. The sunken-can method is an excellent way of giving liquid manure. The sunken-barrel method for raising melons is a development of this idea.

A valuable asset to a garden is a goodly length of hose. With hose a toy irrigation scheme may be arranged merely by making furrows with a sharp-pointed hoe, and sending the water up and down between the rows. In this way such crops as celery and strawberries may be given all the water they need. After the "irrigation" is over, the furrow is covered to prevent evaporation.

The whole problem of shielding seedlings from the sun gives scope for much inventiveness on the part of the gardener.

XVI

STORING OF VEGETABLES

One of the ancient housewifely arts which is being revived to-day is that of storing fruits and vegetables. In the early days, when no green grocer's shop stood at the corner, the preservation of vegetables for the winter supply was a matter of course to the housewife—quite as much her province as to superintend the curing of hams and the spinning of flax.

To-day it may be the urging of Uncle Sam or the incessant preaching of thrift that has started the tide in the old direction; the especial stimulus has probably been a righteous anger at the high cost of foodstuffs. Madam Housewife resents paying for such homely necessities as potatoes and cabbages the price of out-of-season peas or strawberries. Therefore she who is blessed with garden space meets the situation by growing her own vegetables in sufficient quantity to supply her household, and conserving that supply against the winter's need, either by storing in the good old fashion or by preserving or dehydrating in the scientific mode

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of to-day. A modern edition of proverbs would add to the virtues of the woman whose "price was above rubies." Besides "rising while it is yet night and giving meat to her household," the heroine of to-day would give vegetables also. She would have grown enough not only for the summer needs of her family, but she would store enough to last through the hardest winter, and also have some besides to give to the poor and improvident.

The practice of canning and of "dehydrating" is admirable; for the woman who has inadequate storage space it is invaluable. Yet the old method of storing, whereby the crops may be brought out from their cache as fresh as if just from the garden, is better and, whenever possible, should be followed.

In order to store successfully a few points should be understood. First, the character of the different vegetables and their requirements, and, secondly, how one's resources may be adapted to meet their needs. A storage-place that is excellent for celery and "greens" is not the place for keeping squashes. It frequently happens that a conference on storage of the local garden club, or of a few members, results in a satisfactory combination of storage facilities. One may have a cellar which is exactly right for onions, another for root-crops, another for the warmth-loving squashes and sweet potatoes.

STORING OF VEGETABLES

The chief difficulty of the modern housewife is her warm, furnace-heated cellar—most vegetables preferring a dry, cool cellar, just above freezing in temperature. In this case there are three things that may be done. A part of the cellar may be boarded off and made into a storage-room. A double partition with non-conducting air-space will insure coolness, as in an ice-cellar, and an arrangement for ventilation with the outside can be made by pipes or any preferred device. Mrs. Fullerton has an excellent ventilation method in her storage-room, which is under the middle of the house and opens off the cellar.

“A metal leader-pipe, the largest made, was put through the north wall of the house and over the pipe end was placed heavy half-inch meshed, galvanized wire to keep out hungry and inquiring vermin. The pipe runs under the floor to the root-cellar, where it drops to the floor. On the opposite side and going out at the ceiling is a corresponding pipe which leads out of the southern wall, and this opening is also covered with wire. . . . If cold air falls, it comes from the north; if hot air rises, it is drawn out at the south—I know you are wondering what happens when the thermometer falls to zero and all that cold air is rushing down the leader-pipe. There is a damper in each one, like the damper in the kitchen-stove, and this can be turned off when-

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ever it is necessary." As a home-made ventilation scheme, this is very nearly perfect.

Another method is to make a root-cellar, such as many old farmhouses used to have, just as they had the spring-house for a refrigerator. These can



An outside cellar fitted to keep fruit and vegetables

be charming little structures. Sometimes, if the land is so adapted, they are dug into the side of a slope or a hill; sometimes a pit is dug, with a roof sufficiently high to give "headroom"; sometimes the storage-cellar is built against the woodhouse as a "lean-to," the wall on the house side insulated by air-space, the chambers filled with sawdust as in an ice-cellar; the other wall is banked with earth and the top covered with sods. That suggested by Professor Bailey is shown in the illustration.

STORING OF VEGETABLES

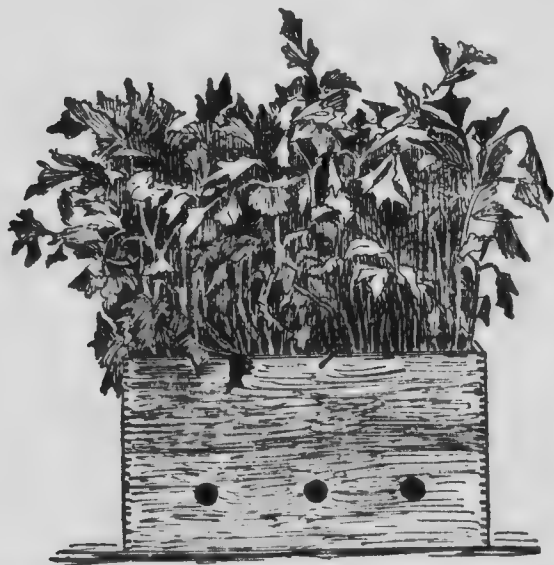
A more picturesque result may be attained if the roof is thatched heavily with straw.

The third method is the more primitive one of making a pit or cache in the open ground where the roots are stored and covered; these pits are broken open and dug into when the vegetables stored there are wanted; a less convenient method than the storage-room, of course, but as far as the keeping of the crops is concerned, perfectly satisfactory. Furnace-heated cellars have caused many a suburban yard to blossom with these little primitive caches until it looks as if the mound-builders had returned and renewed their activity.

Easiest to store are the crops which may be "left out." These, either in cold-frame or in the open are given a slight covering of straw and litter and can resist quite severe cold. Spinach may be brought into the kitchen with snow on it; corn-salad, kale, and spinach should have a light covering of straw or hay. Parsnips may be left in the ground and dug as required with a pickaxe; the only difficulty in this method is the trouble of digging; therefore at the last call for digging, they are taken up and stored in sand. Celery may be left where it is, the plants close-set in the trench for blanching, the earth drawn up until only the tips project. For winter it is covered with hay, and more earth thrown on top. More convenient for the housewife is the practice

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of storing celery in boxes, planting deep in sand which is kept moist by repeated watering of the roots—not the tops; these must not be wet.



Celery packed in box for winter storage in cellar. The holes in side of box are to facilitate watering without wetting tops of plants

Pumpkins and squashes and sweet potatoes must be kept warm. Put them in open baskets or in slatted crates in an up-stairs room that is warm at night—even next to the chimney is none too warm. They have no objection, unlike other vegetables, to the furnace-heat in the cellar and will keep well in baskets slung from the cellar ceiling.

Tornatoes which have not ripened may be picked just before frost, wrapped in tissue-paper, and laid

STORING OF VEGETABLES

in a wooden box. If kept in a cool room, you may have ripe tomatoes until Christmas.

These are the necessities of the important groups of vegetables.

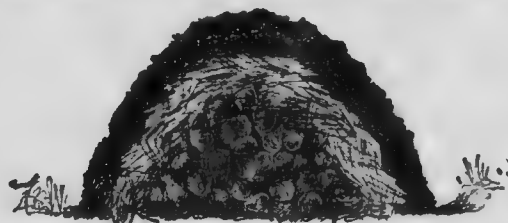
Onions to be stored successfully must first have been planted early, harvested early, and dried while the weather was still warm. The signal for pulling is definite; when the tops fall over and begin to turn yellow is the proper time. They should then be laid out on a floor in a dry, warm place, or else in crates where the air will circulate free. The tops may be twisted off at the time of pulling. When the onions are thoroughly dry and cured, they may be piled in crates and stored for the winter. They like a low temperature, just above freezing, a dry atmosphere, and a good circulation of air. Commercial growers store them in frost-proof houses built above the ground, well ventilated, the onions being kept in tiers of crates with air-space between. Market-baskets slung overhead in a cool, dry cellar will approximate the preferred condition for the home grower.

Other vegetables which like a circulation of air but still must keep their feet moist are celery, leeks, Brussels sprouts, and parsley; these grow after being taken up and stored; therefore they are taken up, planted in boxes of sand, and watered occasionally so that the earth keeps moist. These con-

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sort fairly well with the onions, for the tops are not watered, only the soil in which they stand, and the slight watering is not enough to hurt the onions. Potatoes like a dry cellar, cool and dark and well aired. They should be dug on a cloudy day and dried in the shade before being put in their open barrels for storage.

Root-crops are different; they must be kept cool, fairly moist, and from them the air should be ex-



Outdoor pit of beets covered with straw and earth

cluded. Burrows or out-of-door caches which are usually made above ground may be made for these so-called "pits." Kohlrabi, beets, turnips, carrots, rutabagas are each piled in a conical heap, then about 6 inches of hay is placed over them—salt hay, if you can get it—then earth is piled over to the depth of 6 or 8 inches. If very cold weather is expected, then an extra blanket of manure is added. To get at the cache a pickaxe or old axe is often necessary. The pit should be always opened on the south side. When the opening is once made, pull out enough hay to enable you to reach the buried

STORING OF VEGETABLES

treasure, remove what is required, and plug the hole with salt hay. This is one of the simplest and most primitive methods of storing.

Cabbages, although not a root-crop, may be stored in the same fashion. The outer leaves are pulled off, leaving only the hard heads; these are inverted and piled, roots pointing skyward, and the cabbages arranged in a pyramid. The pyramid is covered with earth. Cabbages may also be stored in barrels the heads inverted, and the barrel filled with earth.

For the housewife who is blessed with a cool cellar or an outside cellar for storage, the easiest way is to get from the grocer dozens of wooden boxes of various sizes, not too large for convenient handling, and in these store the root-crops separately, a layer of sand, a layer of vegetables—parsnips or carrots or whatever it may be—a layer of sand, a layer of earth, then sand, roots, sand again, sandwich fashion. The layer of earth is to give moisture and to absorb any odors in case the vegetables should decay.

By this way of storing in small lots, it is simple for the housekeeper to know always exactly how well her vegetables are keeping.

Fruit requires to be kept cool and dry and in a well-ventilated place. Always it requires careful handling. It may be packed in barrels or boxes fastened securely and stored in a cool place—42° F.

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is a good temperature—or it may be stored in open bins in a cool, dry, well-ventilated place. The former way insures more perfect keeping; the latter is more convenient and very satisfactory. Fruit so stored is looked over often and any apples or pears not keeping well are removed. Preserves and jellies are also kept in the storage-room on shelves made for the purpose. There is no greater tonic to a housekeeper than to go into her storage-room and survey well-filled shelves of jellies and jams, no greater pride than to see, brought up from her cellar, carrots and celery, parsnips and beets as perfect in condition as if just fresh from the garden—it is a pride that is both justifiable and noble.

XVII

DRYING, CANNING, AND PRESERVING

Quite as important as how to grow vegetables and fruits is how to use them when grown and how to utilize any surplus.

The present threatened food shortage has sent women back to the old and almost forgotten art of drying foods, and set them canning and preserving to an extent that has not prevailed in private households since the Revolutionary times, when every housewife put up and stored fruits for her own use. The old methods of drying and preserving are still as good as ever: strings of apples, peeled and quartered, may be hung to dry, and snap-beans may be strung on thread and festooned above the kitchen-stove; raspberries may be dried on bits of bark and used in place of raisins, but the modern housewife has many conveniences which make drying a simpler matter, and the comparatively new method of preserving known as the "one-period, cold-pack method" has made canning easy enough to be successfully undertaken by any ten-year-old youngster who has a fair amount of intelligence.

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The business of home preserving or canning or drying need not be an orgy of industry, dislocating the household, an event from which the male members of the family wish to fly in terror. Instead of this (which was its older significance), it becomes, for the thrifty housewife who is a gardener also, merely a simple practical method of putting away any surplus whenever it occurs, a part of the day's work or the week's work, surely, but involving no great effort, no extraordinary expenditure of time. For we know what our great-grandmothers didn't know—the vital necessity of sterilization; this being accomplished, the rest is easy.

The methods of preserving fruits with abundant sugar, and of pickling, are familiar to all housewives and amply expounded in any good cook-book; therefore these are omitted here, while the newer and extremely convenient one-period, cold-pack method as taught to the canning clubs in the Northern and Western States is not so generally known; therefore it is given here in some detail.

THE ONE-PERIOD, COLD-PACK METHOD

The equipment for this form of canning need not be elaborate. The sterilizing apparatus may be purchased; there are many very satisfactory sorts on the market, the cost of which ranges from \$5.00 to \$50.00. There is the commercial hot-water-bath

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outfit, which is worth while buying if one has large quantities of fruits or vegetables to put up; these are excellent for outside use and have a smoke-stack and fire-box. There is the water-seal outfit, desirable when the cost of fuel has to be considered, for with it a greater heat is possible and the sterilization time is shortened. This outfit is placed directly on the kitchen-stove. Then there are the steam-pressure outfits (which make canning very rapid), and an aluminum pressure-cooker which has a pressure-gauge and a safety-valve and is a very useful addition to the equipment of the home kitchen, for it may be used all the year round.

Very satisfactory canning, however, may be done with home-made outfits. These are made from wash-boilers, tin pails, milk-cans, or metal wash-tubs. The important points are that they should be provided with well-fitting covers (if the cover is not tight a cloth may be laid over the top of the vessel before putting on the cover), and that a false bottom is provided, or a rack, raised an inch above the true bottom of the sterilizing vessel; on this the jars are set. The rack may be made of lath or of wire netting, raised by wooden cleats so that free circulation of the hot water is possible.

Besides the sterilizing outfit, the housewife should have at hand a wire basket or several yards of cheese-cloth for use in blanching, a fork for lifting hot jars,

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a set of measuring-spoons, several sharp and very bright clean paring-knives, five or six acid-proof pans with covers, a fruit funnel, which will save time in filling jars, two tablespoons, six wiping-cloths, two hand-towels, plenty of clean hot and cold water, stove or other heating arrangement. The containers—glass jars, stone crocks, or tins—should be ready and sterilized; any jar that seals perfectly may be used.

First make sure you have a sufficient number of jars for the product about to be canned, and then note the length of time required for sterilizing according to the pattern of sterilizer that you intend to use.

The process is brief.

The most expert housewives can the fruits and vegetables the day they are picked. This is the process: Wash the containers; set glass jars or crocks in a pan of cold water over a fire to heat. They should be hot for use.

Wash vegetables or fruits thoroughly; be sure they are free from all grit; pare if necessary, or pick over carefully.

Blanching or scalding is the next step. Place the vegetables or fruits (soft fruits are not blanched) in a wire basket or in a cheese-cloth bag and dip into boiling water; let remain from 1 to 15 minutes, according to the kind of vegetable or fruit. Then, as

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soon as the basket or bag is removed from the boiling water, dip into clean cold water of as low a temperature as possible, removing quickly and draining for a few minutes.

Next, pack carefully into the hot jars, and as quickly as possible pour over the product boiling-hot syrup (if fruit) or hot salted water (if vegetables). Put rubbers and tops of jars in place (scalded, of course). If cans are used, they must be sealed at this stage.

Place the jars or cans in the hot-water bath or pressure-cooker, or whatever device you have for the sterilizing. When the time is up, remove the jars, seal, invert to cool, and examine closely for leaks and tighten where you find one. When cool, store in a dry, cool place, wrapping the jars in brown paper to prevent any loss of color.

DIRECTIONS FOR CANNING VEGETABLES

Lima Beans, String-Beans, Wax Beans, Stringless Beans, Peas, Okra, Other Pod Vegetables, Green Peppers, Brussels Sprouts, Cabbage.—Wash thoroughly, string or hull, blanch in live steam five or ten minutes. Dip quickly in cold water, then pack immediately into hot glass jars or tin cans. Fill the container with boiling water, adding one level teaspoonful of salt to each quart. Place in position rubbers and caps of jars, but do not secure tightly. Tin cans at this stage, however, must be completely

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sealed. Sterilize for the time required according to the kind of apparatus used. When sterilized, remove from container with a duplex fork, tighten covers, invert, let cool, and test jars for possible leakage. Wrap in paper to prevent discoloration or loss of color and store in a cool place.

In canning the following vegetables, the process after blanching is identical with that given above. Any variations are noted.

Cauliflower.—Wash thoroughly, remove coarse leaves, using for canning only the flowered portion. Make a brine of $\frac{1}{2}$ pound salt to 12 quarts of water; plunge cauliflower in this and let it remain one hour; then blanch for three minutes in boiling water, cold-dip, and continue process.

Root or Tuber Vegetables, Including Parsnips, Carrots, Turnips, Sweet Potatoes, Salsify.—Wash thoroughly, scrubbing with vegetable-brush. Scald sufficiently to loosen skin. Dip immediately on removing, into cold water, then pare or scrape off skin. Pack whole vegetables, cross-sections, pieces, slices, or cubes into hot jars, add boiling water, and continue process.

Beets.—Same as other root-vegetables, except that they are preferably packed whole, and that 1 inch of stem and all the tail should be left on while blanching. Blanch not more than five minutes, then cold-dip. Scrape—do not peel the skin from beets.

DRYING, CANNING, AND PRESERVING

Greens (including kale, cress, cabbage-sprouts, endive, turnip-tops, lettuce-tops, dandelions, New Zealand spinach, Swiss chard, Brussels sprouts, cabbage) should be canned the day of picking. Pick over carefully, removing all grit and sand, all decayed and coarse leaves and stems. Place in cheesecloth or wire basket, and blanch in live steam for fifteen minutes. Do not let the product touch the water. Remove, plunge in cold water, cut into convenient lengths, and pack in hot jars, filling receptacle tightly. Continue process. (The greens will be improved if a few strips of boiled bacon or a little olive-oil is added before placing in sterilizer.)

Tomatoes.—There are many excellent recipes for canning tomatoes. Scald one and one-half minutes or until the skins loosen. Cold-dip, core, skin, and pack whole into hot jars or cans, pressing down with tablespoon and filling tightly. Add no hot water, fit rubbers and jar-tops, and continue process.

Pumpkin, Squash.—Prepare and cut into sections which may be conveniently packed. Blanch three minutes, and continue process.

Pumpkin and squash for pies, etc. Cut in small pieces and cook for thirty minutes. To each quart of pulp add 1 cup of sugar, 1 teaspoonful of salt, pack in hot jars, and continue process.

Corn.—To select corn at exactly the right stage for canning requires some experience. It should be

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between the so-called "milk stage" and the "dough stage." Corn that has attained the dough stage has a cheesy appearance when canned. If possible the canner should have an assistant, for the corn is blanched on the cob, then cut from it with a sharp knife, and should be packed immediately into the hot jars. If one must do the work alone, enough corn only should be cut to fill a jar, which should then be put directly in the sterilizer. Quick work is essential to successful canning of corn.

Corn on Cob.—Remove husk and silk, blanch on cob five minutes, cold-dip, and pack whole ears in hot jars, and continue process.

Sweet Peppers.—Place in oven and bake until the skin separates from the meat, remove skins, pack closely in hot jars, add hot water, and continue process.

CANNING OF FRUITS

The process is essentially the same as for canning vegetables, except that blanching is omitted, and that instead of hot, boiling water and a teaspoonful of salt, a hot syrup is added to fill the jar. The syrup is made as follows:

WESTERN FORMULA

3 quarts sugar.
2 quarts of water.

EASTERN FORMULA

2 quarts of sugar.
3 quarts of water.

Boil until the desired thickness is obtained.

DRYING, CANNING, AND PRESERVING

Syrups for canning use are differentiated as follows:

Thin syrup: Not sticky, yet all the sugar is dissolved.

Medium thin syrup: The liquid has begun to thicken and, cooled on a spoon, is sticky.

Medium thick syrup: Of sufficient density to pile on the rim of the spoon as one pours.

Thick syrup: Hard to pour, but yet it has not sugared.

Soft Fruits and Berries.—Under this classification are included blackberries, blueberries, huckleberries, currants, dewberries, gooseberries, raspberries, and strawberries. Also figs, grapes, peaches, plums, cherries, apricots. Skin, seed, stem, or hull the fruit, place in strainer or colander, and rinse thoroughly with cold water. Pack into hot jars without crushing, using fruit funnel and ladle or large spoon. Pour over fruit at once the previously prepared hot thin syrup. Place rubbers and jar-tops in position at once, before packing a second jar. If tin cans are used, they must at this stage be sealed completely. Place product in sterilizer and continue process as for vegetables.

Sour cherries, currants, gooseberries, cranberries should be scalded for one minute, then dipped in cold water, packed closely in hot jars, and the jars filled with medium thin syrup.

HOME VEGETABLES AND SMALL FRUITS

TIME-TABLE FOR BLANCHING AND STERILIZING

Vegetables	Blanching Minutes	Hot Water Minutes	Water- Seal Minutes	Steam- Pressure Minutes	Alumi- num Cooker Minutes
Tomatoes.....	1½	22	18	15	10
Sweet Peppers.....	...	90	75	60	45
Pumpkin.....	...	...	...	...	...
Squash.....	3	120	90	60	35
“ for pies.....	30 (cook)	120	90	60	35
Corn.....	5	180	120	90	60
Cauliflower.....	3	60	40	30	20
Wax-Beans.....	5-10 in live steam	120	90	60	40
Stringless Beans.....					
Okra.....					
Green Peppers.....					
Cabbage.....	5-10 in live steam	180	120	60	40
Brussels Sprouts.....					
Lima-Beans.....					
Peas.....					
Pod Vegetables.....	5-8	90	80	50	30
Carrots.....					
Parsnips.....					
Turnips.....					
Sweet Potatoes.....	3-8	90	80	50	30
Beets.....					
Greens, including cress, cabbage-sprouts, en- dive, turnip-tops, beet- tops, Swiss chard, New Zealand spinach, kale, etc.....	15 in live steam	120	90	60	40
FRUITS					
Apricots, plums, peaches, cherries, blackberries, blueberries, currants, dewberries, goose- berries, grapes, huckle- berries, raspberries, strawberries, figs.....	no blanching	16	12	10	5
Sour cherries, currants, gooseberries, cran- berries.....	1	16	12	10	5
Apples, pears, quinces.....	1½	20	12	8	6

DRYING, CANNING, AND PRESERVING

Hard Fruits, Apples, Pears, Quinces.—Core, pare, cut in convenient pieces, and drop into salted cold water to keep from discoloration. Blanch one and a half minutes. Fill jars with medium thin syrup, and continue process.

Whole Apples, First Grade, Perfect.—Pare, core, drop into cold slightly salted water to prevent discoloration. Pack in 2-quart jars or gallon tins. Fill containers with thin hot syrup and continue process.

Windfall and Defective Apples.—Pare, remove blemishes, core, blanch in boiling water two minutes. Cold-dip. Pack in tins or hot glass jars, add a little thin syrup, continue process.

For pie filling, same process except that the apples are sliced and that a teacup of hot thin syrup is added to each quart of product when packed in container. Place rubbers and jar-caps and continue process.

THE DRYING OF FRUITS AND VEGETABLES

It is one of the oldest and most primitive of housewifely arts, the drying of fresh food for winter use. For the modern housekeeper, especially for the city and suburban woman, or the flat-dweller who has but scanty storage space, a small supply of glass jars, and no cool cellar in which to stack barrels and boxes of vegetables in sand, dried food is of especial

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value. It is greatly reduced in bulk, easily cared for, and requires no low temperature for successful keeping, merely dryness, which commodity the average furnace-heated house usually has to excess.

The methods of drying are various, but the essentials are the same; namely, that the fruit or vegetable be cut in sufficiently small pieces to make thorough and even drying possible, and that the drying be done slowly enough at first to avoid a hardening of the outer surface while the inside is yet moist. The air temperature should be kept well below 140° to 150° F. The product must not be burned or scorched, but it must be dried uniformly through and through. Therefore it follows that during drying the subject should be turned or stirred to insure even drying.

Conditioning is necessary before storing, that is, the dried product is put into small boxes and poured from one to the other once a day. This serves to secure the same degree of moisture for the lot, and if it be too moist, the material is returned to the drier and given another treatment. "Conditioning" should be carried on for four or five days. After this, the product may be stored. Tins or jars, close-fitting covered pasteboard boxes or paper bags may be used for storing.

DRYING, CANNING, AND PRESERVING

WAYS OF DRYING

The most primitive method is sun-drying. This is only possible on bright sunny days, for the product must be guarded against dampness. After being prepared the material is placed in ventilating trays, spread on sheets of paper or on pieces of muslin, weighted down. Complete and successful protection against insects is necessary, and watchfulness against rain. Once or twice a day the slices are turned or stirred; the thinner ones, which dry first, are taken out. In sun-drying there is no danger from overheating; the enemies are flies and other insects and dust.

Drying-trays can be made of strips of lumber $\frac{3}{4} \times 2$ inches for the sides, while the bottom may be made of lath spaced an eighth of an inch apart. Galvanized-wire screening of $\frac{1}{8}$ or $\frac{1}{4}$ inch mesh may be used for the tray bottom instead of lath. The size is regulated by convenience. Those of lath are 4 feet wide—the usual width of lath. Those of the wire-mesh bottoms are governed by the width of the wire netting.

DRYING BY ARTIFICIAL HEAT

There are many excellent driers on the market—driers which can be used on a lamp or a gas-stove or an ordinary kitchen-range; there are also larger

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commercial driers for community drying, the cost of these running from \$24 to \$650. The simplest form of artificial heat-drying is oven-drying. Small quantities of vegetables or fruits are placed on plates or on a wire-mesh tray and dried in a very slow oven, with the oven-door left open. The thrifty cook in this way dries any left-overs that have possibilities as dried foodstuffs.

Over the Stove.—For this the home-made wire-mesh tray is used. It may be made like a greenhouse flat, only with a wire-mesh bottom, or may be made entirely of the screening with 2 inches of the screen bent up and secured at the corners to form sides. These are used singly, swung over the stove, or lath at the four corners makes a four or five story arrangement, which also is swung over the stove, usually on a crane of some sort, sometimes like that on which, in country kitchens, dish-towels are hung for drying, so that the drier may be brought into position, and then pushed out of the way. If used over an oil-stove the drier must have a tin or galvanized iron bottom so that the fumes of the oil or the smoke may not affect the excellence of the product.

Drying by Air-Blast.—Here the electric fan finds new employment. The material is placed in wooden-sided trays with wire-mesh bottoms—trays of uniform size which are set, one on top of the other,

DRYING, CANNING, AND PRESERVING

cabinet form. The side toward the fan, however, is open.

The time of drying requires a little experience. The product should be pliable, rather leathery in character. The natural grain of the fruit will not be observable, but yet the pieces must not be brittle.

Preparation of Fruits and Vegetables for Drying.—Food may be sliced ($\frac{1}{8}$ to $\frac{1}{4}$ inch thick), run through a meat-grinder or a rotary slicer. Vegetables and fruits should be fresh, well washed, root-vegetables pared. Absolute cleanliness is necessary. Blanching and cold-dipping in the same way as for canning is of value in setting the color, and is generally used by successful workers. Remove surface moisture after blanching by putting products between two towels or exposing for a short time to the sun.

DIRECTIONS FOR DRYING VEGETABLES

Spring or Snap Beans.—Wash and string carefully; cut mature beans in lengths $\frac{1}{2}$ to 1 inch. Blanch and cold dip (p. 168), using $\frac{1}{2}$ teaspoonful soda in each gallon of boiling water. Dry young beans 2 hours, mature beans 3 hours, at temperature beginning at 110° , raising to 145° F.

(2) Prepare as above, but instead of blanching place on trays and dry. They may be run through slicer and dried very quickly.

(3) Wash, stem, and string. Take strong thread

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and string, necklace fashion. Hang over stove or outdoors.

Beans, Lima.—(1) Shell and dry from 3 to 3½ hours—110° to 145° F.

(2) Immature Limas. Blanch 5 to 10 minutes, dry as above.

Beets.—(1) Boil until ¾ done. Cold dip, peel, slice, then dry 2½ to 3 hours. 110° to 150° F.

(2) For young, tender beets—wash, peel, slice ⅛ inch thick, and dry.

Beet-Tops.—Wash, cut in sections ¼ inch, spread on trays, and dry.

Brussels Sprouts.—Same as cauliflower.

Cabbage.—(1) Take only good heads; remove outside leaves. Split and take out the hard core, slice head and dry.

(2) Shred, blanch 10 minutes, dry 3 hours at 110°, raising to 145° F.

Carrots.—(1) Slice lengthwise in slices about ⅛ inch thick, after thoroughly washing and peeling; then dry.

(2) Prepare as above, blanch 6 minutes, dry 2½ to 3 hours at 110°, raising to 150° F.

Cauliflower.—Clean, divide in small bunches, blanch 6 minutes, dry 2 to 3 hours at 110°, raising to 145° F.

Celery.—Treat like beet-tops, also like summer squash.

DRYING, CANNING, AND PRESERVING

Corn.—Use only young, tender corn, and dry immediately after picking. (1) For sun-drying put in oven 10 to 15 minutes first, heating again in oven after sun-drying destroys possible insect eggs. (2) Blanch in live steam, on cob, 8 to 10 minutes, adding a teaspoonful of salt to the gallon of water. Cut corn from cob with a sharp knife, cutting only half the grain and scraping off the remainder; none of the shag next the cob should be cut off. Boil 3 to 4 minutes, 110° to 145° F. (3) Boil 2 to 5 minutes, cut off from cob, spread thinly on trays, and dry.

Leeks. (See *Onions.*)

Onions.—(1) Well-matured onions; remove outside covering, papery skin, tops, and roots, cut in cross-sections $\frac{1}{8}$ inch thick, dry quickly.

(2) Peel and slice onions into $\frac{1}{8}$ or $\frac{1}{4}$ inch thick cross-sections while holding under water. This will make peeling possible without tears. Blanch 5 minutes, remove surface moisture, and dry 2½ to 3 hours, 110° to 140° F.

Parsley.—Wash well, removing roots, spread on trays, and dry thoroughly.

Parsnip.—(See *Carrots.*)

Peas.—(1) (With non-edible pod). Shell, blanch 3 to 5 minutes, remove moisture, spread thinly on tray, dry from 3 to 3½ hours at 110°, raising slowly in about 1½ hours to 145° F. Continue drying at the higher temperature. (2) Shell, put through meat-

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grinder, spread on trays, and dry. (3) *Sugar peas*, young enough to have edible pods. Wash, cut in $\frac{1}{4}$ -inch pieces, blanch 6 minutes, dry 2 hours at 110° , raising to 145° F. (4) Shell and place on trays for drying.

Peppers.—(1) (Small red peppers.) Dry in sun. Both these and green peppers may be dried whole, strung on thread like string-beans, or the whole plant may be dried. (2) Place in oven until skin is easily removed, split in half, remove seed, dry, 110° , raising to 140° F.

Potatoes.—(1) Boil until nearly cooked, peel, cut in $\frac{1}{4}$ -inch slices, spread on trays, and dry until brittle. (2) Boil or steam until nearly cooked, peel, run through meat-grinder or ricer. Spread on tray and dry until brittle.

Potatoes (Sweet).—(1) Same treatment as above (2), or slice instead of running through chopper.

(2) Wash, peel, slice, dip in salted water, then dry.

Pumpkins.—(1) Peel, cut into strips, remove seeds and soft part, cut strips into pieces not over $\frac{1}{4}$ inch thick and 2 inches long, then dry. (2) Pare, cut into $\frac{1}{2}$ -inch strips, blanch 3 minutes, remove moisture, dry 3 to 4 hours, 110° , raising to 140° F.

Rhubarb.—Skin leaf-stalks, cut into lengths $\frac{1}{4}$ to $\frac{1}{2}$ inch. Same treatment as beet-tops.

Salsify.—Same treatment as carrots.

Spinach. Same treatment as parsley.

DRYING, CANNING, AND PRESERVING

Squash.—Same as pumpkin.

Swiss Chard.—Same treatment as beet-tops.

Turnips.—Same treatment as beets.

FRUITS

Apples.—These need only be sufficiently dried to become tough and rather leathery. (1) After peeling, core and slice $\frac{1}{4}$ inch thick. Dip in salt water (8 teaspoons to the gallon). Spread on trays and dry. (2) Pare, core, cut into rings or eighths, dip in salt bath for 1 minute, dry 4 to 6 hours, 110° , raising to 150° F.

Apricots.—(1) Remove pit, cut fruit in halves, spread on trays to dry. (2) Prepare as above, lay in trays pit side up, dry at same temperature and same time as apples.

Blackberries.—(1) Sort carefully using only good berries, spread on trays. Dry until on pressing in the hand the berries fail to stain it. (2) Pick over and sort, removing all leaves and stems. Spread thinly on tray and dry very slowly, taking 2 hours to raise from 110° to 125° F., and bring temperature up to only 130° F., when most of the moisture has evaporated. Drying should be finished by 2 to 3 hours at 140° F. Four to 5 hours are necessary for proper drying of berries.

Cherries.—Pick over carefully, removing stems, if large cherries are used, pit also. Spread on trays

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to dry. Wash, remove surface moisture; do not seed, but spread on trays in a thin layer. Dry 2 to 4 hours at 110°, raising to 150° F. very gradually.

Dewberries.—Same treatment as blackberries.

Huckleberries.—Same treatment as blackberries.

Peaches.—Same as apricots (1) and (2).

Pears.—Same treatment as apples.

Plums.—Take medium ripe plums. Plunge in boiling water, cover the kettle and let stand for 20 minutes. Drain, dry from 4 to 6 hours at 110°, raising to 150° F. Also same as apricots.

Quinces.—Same treatment as apples.

Raspberries.—Same treatment as blackberries.

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